REPORT

Bushfire Threat Assessment

3 Quarry Road, Dural

Prepared by:	**RPS AUSTRALIA EAST PTY LTD** Ground Floor, 241 Denison Street Broadmeadow, NSW 2292 Australia PO Box 428, Hamilton NSW 2303	**Prepared for:**	**THELEM CONSULTING PTY LTD**
T:	+61 2 4940 4200	**M:**	0488 171 485
E:	newcastle@rpsgroup.com.au	**T:**	02 9188 9606
		E:	mailto:ngrice@thelem.com.au

Author:	Duncan Scott-Lawson
Reviewed:	Ted Smith, Peak Land Management
Approved:	Ian Murphy

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BPD-PD Certification

Ted Smith
BPD-PD-17671 Accredited Bushfire Practitioner

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Contents

SUMMARY **5**

TERMS AND ABBREVIATIONS **11**

1 INTRODUCTION **12**
1.1 Site Particulars **12**
1.2 Description of Proposal **15**
1.2.1 Assembly building (Wellness Centre) 15
1.3 Objectives of Assessment **16**
1.4 Specific Objectives for Special Fire Protection Purpose Developments **16**

2 BUSHFIRE HAZARD ASSESSMENT **17**
2.1 Vegetation Assessment **17**
2.1.1 Methodology 17
2.1.2 Predominant Vegetation Formation 17
2.2 Effective Slope Assessment **23**
2.2.1 Methodology 23
2.2.2 Effective Slope 23
2.3 Significant Environmental Features **23**
2.4 Significant Threatened Species **23**
2.5 Cultural Significance **23**
2.6 Bushfire Risk Management **24**

3 BUSHFIRE PROTECTION MEASURES **27**
3.1 Asset Protection Zones **27**
3.1.1 Determining the appropriate setbacks 27
3.2 Building Design and Construction **27**
3.2.1 Bushfire Attack Level for the Proposed Development 28
3.3 Access **30**
3.4 Water **31**
3.5 Gas **31**
3.6 Firefighting Capacity **32**
3.7 Landscaping **32**
3.8 Fuel Management **32**
3.9 Emergency Evacuation Management **32**

4 CONCLUSION AND RECOMMENDATIONS **34**

5 BIBLIOGRAPHY **36**

Tables

Table 1 Vegetation Classification 17
Table 2 Site Slope Assessment 23
Table 3 Bushfire Management Zones 24
Table 4 Asset specific treatments used in the Hornsby/Ku-ring-gai BFMC area 25
Table 5 Separation distances for class 9c residential SFPP buildings A-H 28
Table 6 Separation distances for class 9b assembly building 28

Figures

Figure 1 Site Location 13
Figure 2 Hornsby LEP Land Zoning Map 14
Figure 3 Bushfire Prone Land Map of the Site (Hornsby Council) 14
Figure 4 Site Analysis (Marches partners, 29 May 2018) 15
Figure 5 Vegetation classification 22
Figure 6 Hornsby Bushfire Risk Management Plan 25
Figure 7 Required BAL (AS3959-2009) 29

Plates

Plate 1 Scrub vegetation on Pacific Hills Christian School to the east of the site 19
Plate 2 Forest and Rainforest vegetation on eastern boundary of site (Trees behind rainforest vegetation are isolated and a further 50m to the north) 19
Plate 3 NORTH: Rural residential and cleared lands, Vineys Road 20
Plate 4 EAST: Remnant vegetation and small scale garden industry 20
Plate 5 SOUTH: Rural residential and cleared lands, Quarry Road 21
Plate 6 WEST: Rural residential and cleared lands, Gardens plantations 21

Appendices

Appendix A Concept Plan
Appendix B AHIMS Report
Appendix C Traffic Plan (GTA Consultancy)

Summary

RPS has been engaged by Thelem Consulting Pty Ltd to undertake a Bushfire Threat Assessment (BTA) for a proposed seniors housing at Lot 2A DP158064 and Lot 1 DP230172, also known as 3 Quarry Road and 4 Vineys Road, Dural, NSW. The proposed development is classified as a Special Fire Protection Purpose (SFPP) development under Planning for Bushfire Protection 2006 (PBP 2006) given its function is to provide housing accommodation for seniors. The occupants of the proposed development may be more vulnerable to bush fire attack and therefore may require greater protection from such threats as well as assisted evacuation.

The assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to such a proposal, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the Planning for Bush Fire Protection, 2006 that has been released and adopted through the Environmental Planning & Assessment Amendment (Planning for Bush Fire Protection) Regulation 2007 & the Rural Fires Amendment Regulation 2007.

In order to determine whether the proposed development is bushfire prone, and if so, which setbacks and other relevant Bush Fire Protection Measures (BFPM) will be appropriate, this assessment adheres to the methodology and procedures outlined in “Planning for Bushfire Protection” (NSW Rural Fire Service, 2006) (hereafter referred to as ‘PBP 2006’) and cl. 44 of the Rural Fires Regulation 2013.

This BTA found the land surrounding the proposed development to support vegetation consistent with a combination of Rainforest and Forest as described by PBP 2006. A perimeter road exists along the western boundary providing a defendable space between the low-threat pine plantation. The entrances and exits of all buildings comply with 10kw/m^2 requirement within the PBP (2006).

In summary, the following key recommendations have been generated to enable the proposed development to comply with PBP 2006:

- The entire development site is to be managed as an inner protection area (IPA) as outlined with section 4.1.3 and Appendix 5 of ‘Planning for Bushfire Protection 2006 and the NSW Rural Fire Services’ document ‘Standards for Asset Protection Zones’;
- All proposed structures to be built on the site should have due regard to the specific considerations given in the BCA, which makes specific reference to the Australian Standard (AS3959 – 2009) Construction of buildings in bushfire prone areas;
  - Building G within the class 9c residential SFPP buildings shall comply with Sections 3 and 5 (BAL-12.5) AS3959-2009 and section A3.7 Addendum Appendix 3 of 'Planning for Bush Fire Protection 2006';
  - The entire “Wellness Centre” assembly building class 9b shall comply with Sections 3 and 6 (BAL-19) AS3959-2009 and section A3.7 Addendum Appendix 3 of 'Planning for Bush Fire Protection 2006';
- Internal roads are to be constructed in accordance with PBP 2006 or alternate solution as outlined in section 3.3 of this report, specifically:
  - It is recommended the turning circle be increased to 12m in accordance with PBP (2006) to accommodate fire-fighting appliances.
  - The installation of appropriate traffic management such as construction of road shoulders that facilitate passing vehicles, shrub vegetation not be established in the side of the road between the administration building and assembly building to facilitate line of sight between passing bays and

vehicle passing in general, and appropriate road side signage for dead-end, no parking, and passing bays be established.

- Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site especially the provision of defendable space between the assembly building and bush fire hazard to the east;
- It is recommended a minimum 1.8-metre-high radiant heat shield made of non-combustible materials shall be constructed along the eastern and northern boundary adjacent to the “Wellness Centre” assembly building. All posts and rails shall be constructed of steel. The bottom of the fence is to be in direct contact with the finished ground level or plinth.
- The proposed facility is to be linked to the existing mains pressure water supply and suitable hydrants be clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure should comply with AS2419.1, 2005;
- A hydrant will be located to the north-western corner of the wellness centre, adjacent, but not restricting the use of the turn-around bay or access to the northern side of the wellness centre, to provide dedicated static water supply to responding fire services;
- A Bush Fire Emergency Management and Evacuation Plan shall be prepared consistent with 'Development Planning A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan December 2014' and Australian Standard AS3745 2010 'Planning for Emergencies in Facilities'. Attention within this plan should focus on the procedure to evacuate and close the assemble area in the event of a bushfire attack.

This assessment has been made based on the bushfire hazards in and around the site at the time of inspection and production (March 2018).

Finally, the implementation of the adopted measures and recommendations forwarded within this report are based on a thorough assessment under the Planning for Bushfire Protection 2006 to manage the risk caused by bushfire to people, property and public safety. The recommended bushfire protection measures will contribute to the amelioration of the potential impact of any bushfire upon the development estate, but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

RPS

Planning for bushfire protection compliance (PBP 2006)
Planning controls for Wellness-centre Class 9b

Performance criteria in accordance with 4.2.3 PBP (2006)	
Provide for the special characteristics and needs of occupants. Unlike residential subdivisions, which can be built to a construction standard to withstand the fire event, enabling occupants and firefighters to provide property protection after the passage of fire, occupants of SFPP developments may not be able to assist in property protection. They are more likely to be adversely affected by smoke or heat while being evacuated.	**Yes** – The design of the building has considered the requirement for less mobile individuals before, during and after a bush fire attack event by locating the entrance and exit of the building away from the bushfire threat and close to vehicle access. The design of the building has considered the requirement for fire fighters to provide property protection with vehicle access provided along the west of the building footprint. Road side guttering will facilitate vehicle access to the northern side of the wellness centre. Furthermore, a hydrant will be located to the north-western corner of the wellness centre, adjacent, but not restricting the use of the turn-around bay or access to the northern side of the wellness centre, to provide dedicated static water supply to responding fire services. Landscaping surrounding the wellness centre will be managed as an inner protection area (IPA) as outlined with section 4.1.3 and Appendix 5 of 'Planning for Bushfire Protection 2006 and the NSW Rural Fire Services' document 'Standards for Asset Protection Zones';
Provide for safe emergency evacuation procedures. SFPP developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bush fire threats.	**Yes** – The entrance/exit of the building is situated away from the fire hazard, with the building providing a shield to the entrance/exit. Vehicle access is provided approximately 10 metres along a formed path from the exit of the building that facilitates evacuation procedures. The 'emergency and evacuation plan' for the development shall include procedure for assessing the location and threat of bushfires within the district. If the Bush fire is a threat, closure of the wellness centre until the threat has passed should be incorporated into this plan.
During emergencies, the risk to firefighters and other emergency services personnel can be high through prolonged exposure, where door-to-door warnings are being given and exposure to the bush fire is imminent.	**Yes** – The establishment of a procedure for closing the wellness centre during local bushfire events will remove the requirement for fire fighters or emergence service workers to be in or around the wellness centre. Furthermore, the location of the exit and entry point to the building also provides an added feature to ensure any fire fighters or emergence service workers have a level of shielding with entering or exiting the building.

RPS

Planning for bushfire protection compliance (PBP 2006)

Planning controls for Residential building (Buildings a to H) Special Fire Protection Purposes

Performance Criteria	Determination of Proposed Development	COMPLIES
Asset Protection Zones		
Radiant heat levels greater than 10kW/m^2 will not be experiences by occupants or emergency services workers entering or exiting the building	▪ An APZs is provided in accordance with the relevant tales and figures in Appendix 2 of PBP (2006). ▪ Exits are located away from the hazard side of the building. ▪ The APZ is wholly in the boundaries of the development site.	**Yes** – Building entrances are away from the hazard and exposed to less than 10kw/m^2 radiant heat. APZs comply with these minimum requirements.
The applicant demonstrates that issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fires is negated	▪ Mechanisms are in place to provide for the maintenance of the APZ over the life of the development. ▪ The APZ is not located on lands with a slope exceeding 18 degrees.	**Yes** – APZ is not on a slope exceeding 18 degrees and maintenance of APZ can be made a condition of consent.
APZ are managed and maintained to prevent the spread of fire towards the building	▪ In accordance with the requirements of 'Standards for Asset Protection Zones (2005)	**Yes** – APZ shall be in compliance with RFS Asset Protection Zones (2005)
	▪ Compliance with Appendix 5 of PBP (2006).	**Yes –** APZ shall be in compliance with Bush Fire Provision – Landscaping and Property Maintenance
Access - Internal Roads		
Internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle.	▪ Internal roads are two-wheel drive, sealed, and all-weather. ▪ Internal perimeter roads are provided with at least two traffic lane widths (carriage 8 metres minimum kerb to kerb) and shoulders on each side, allow traffic to pass in opposite directions. ▪ Roads are through roads. Dead end roads are not more than 100m in length from a through road, incorporated a minimum 12 metres outer radius turning circle, and are clearly posted as a dead end. ▪ Traffic management devices are constructed to facilitate access by emergency services vehicles. ▪ A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches, is provided. ▪ Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.	**Yes** – Internal roads are 2-wheel drive, appropriate capacity, clearances and grades. Inner curves have a minimum radius of 6m. No bridges, flood or wetland issues. Perimeter and internal road are not 8m wide, outer radius of turning circle are not 12m and through roads are long than 100m. Alternative solutions are proposed in section 3.3 and supported by a traffic plan developed by GTA

	▪ The minimum distance between inner and outer curves grades are not more than 10 degrees. ▪ Maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees. ▪ Cross fall of the pavement is not more than 10 degrees. ▪ Roads do not transverse through wetland or other land potentially subject to inundation. ▪ Roads are clearly sign-posted, and bridges clearly indicate load ratings. ▪ The internal road surface and bridges have a capacity to carry fully-loaded fire fighting vehicles (15 tonnes).	consultants provided in Appendix C. This traffic report has considered the egress of emergency services vehicles for the development.
Water, Electricity and Gas		
RETICULATED WATER SUPPLY Water supplies are easily accessible and located at regular intervals	▪ Access points for reticulated water supply to SFPP development incorporate a ring main system for all internal roads. ▪ Fire hydrant spacing, sizing and pressure comply with AS2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressure anticipated by the relevant water supply authority, once development has been completed. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. ▪ The provision of public roads in section 4.1.3 in relation to parking are met.	**Yes** – Can be made condition of consent
NON- RETICULATED WATER SUPPLY A water supply reserve dedicated to firefighting purposes is installed and maintained. The supply of water can be an amalgam of minimum quantities for each lot in the development and be reticulated with dedicated firefighting lines.	▪ 10000 litres is the minimum dedicated water supply required for firefighting purposes for each occupied building, excluding drench systems. ▪ The provision for suitable connection for RFS and/or NSW FB purposes in section 4.1.3 in relation to water supplies is made available.	**Yes** – Can be made condition of consent
ELECTRICTY Location of electricity services will not lead to ignition of surrounding bushland or the fabric of buildings or risk to life from damaged electrical infrastructure.	▪ Electricity transmission lines are under ground.	**Yes** – Electricity is under ground.

GAS Location of gas services will not lead to ignition of surrounding bush land or the fabric of buildings.	▪ Reticulated or bottled gas is installed and maintained in accordance with AS1596-2002 and the requirements of relevant authorities. Metal piping is to be used. ▪ All fixed LPG tanks are kept clear of all flammable materials and located on the non-hazard side of the development. ▪ If gas cylinders need to be kept close to the building, the release valves must be directed away from the building and away from any combustible material, so they do not act as a catalyst to combustion. ▪ Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.	**Yes** – Can be made condition of consent
Emergency and Evacuation planning		
An Emergency and Evacuation Management Plan is approved by the relevant fire authority for the area.	▪ An emergency/evacuation plan is prepared consistent with the RFS Guidelines for the Preparation of Emergency/Evacuation Plan. ▪ Compliance with AS 3745-2002 'Emergency control organisation and procedures for buildings, structures and workplaces' for residential accommodation'. ▪ Compliance with AS4083-1997 'Planning for emergencies – for health care facilities'. The developer should provide a copy of the above document to the local Bush Fire Management Committee for their information prior to the occupation of any accommodation of a special fire protection purpose or community title subdivision.	**Yes** – Can be made a condition of consent.
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan.	▪ An emergency management committee is established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedure Manual. ▪ Detailed plans of all Emergency Assembly Areas including 'onsite' and 'offsite' arrangements as stated in AS 3745-2002 are clearly displayed, and an annual (as a minimum) trail emergency evacuation is conducted.	**Yes** – Can be made a condition of consent.

BUSHFIRE CERTIFICATION

The report has been prepared by Duncan Scott-Lawson, RPS. Ted Smith, PEAK LAND MANAGEMENT being a BPAD Level 3 Bushfire Practitioner, has reviewed this Bushfire Threat Assessment Report and subject to Rural Fire Service review and approval of the alternate solution understands the proposed development design conforms to the relevant specifications and requirements of AS 3959-2009 Building in Bushfire Prone Areas and Planning for Bushfire Protection (2006).

Terms and Abbreviations

Abbreviation	Meaning
AHIMS	Aboriginal Heritage Information Management System
APZ	Asset Protection Zone
AS2419-2005	Australian Standard – Fire Hydrant Installations
AS3959-2009	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BCA	Building Code of Australia
BRMC	Bushfire Risk Management Committee
BFRMP	Bush Fire Risk Management Plan
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BPL	Bush Fire Prone Land
BPL Map	Bush Fire Prone Land Map
BPMs	Bush Fire Protection Measures
BTA	Bushfire Threat Assessment
EPA Act	*NSW Environmental Planning and Assessment Act 1979*
EPBC Act	*Commonwealth Environment Protection and Biodiversity Conservation Act 1997*
FDI	Fire Danger Index
FMP	Fuel Management Plan
ha	Hectare
IPA	Inner Protection Area
LEP	Local Environment Plan
LGA	Local Government Area
OPA	Outer Protection Area
PBP 2006	Planning for Bushfire Protection 2006
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation
RPS	RPS Australia East Pty Ltd
HSC	Hornsby Shire Council
TSC Act	*NSW Threatened Species Conservation Act 1995*

1 Introduction

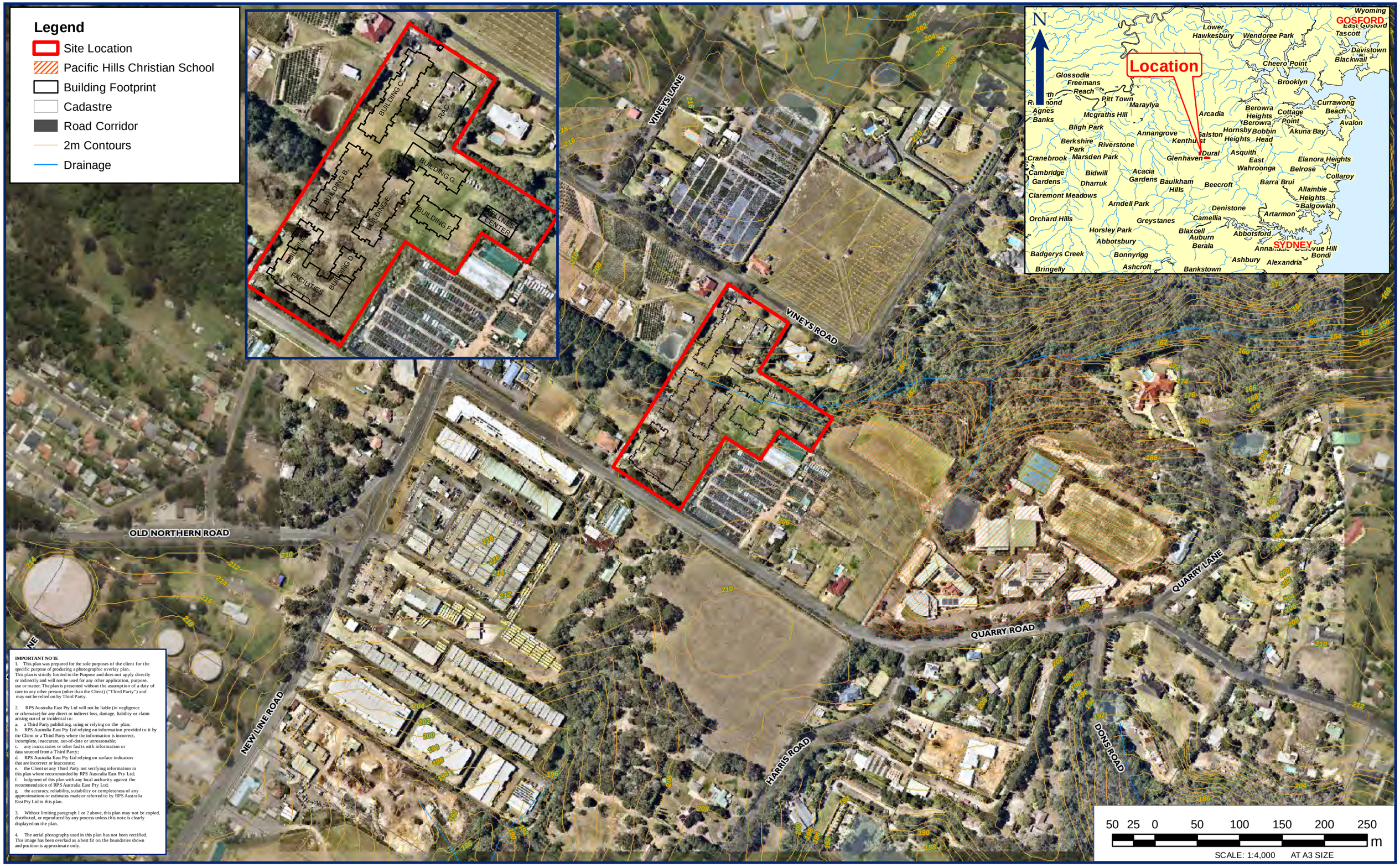
RPS has been engaged by Thelem Consulting Pty Ltd to undertake a Bushfire Threat Assessment (BTA) for a development at Lot 2A DP158064 and Lot 1 DP230172, also known as 3 Quarry Road and 4 Vineys Road, Dural, NSW, hereafter referred to as the 'site' (Figure 1). The proposed development is classified as a Special Fire Protection Purpose (SFPP) development under Planning for Bushfire Protection 2006 (PBP 2006) given its function is to provide housing accommodation for seniors including people requiring full-time assisted care. The occupants of the proposed development may be more vulnerable to bush fire attack and therefore may require greater protection from such threats as well as assisted evacuation.

In accordance with Section 91 of the NSW Environment Planning and Assessment Act 1979 (EP&A Act) and Section 100B of the NSW Rural Fires Act 1997 (RF Act), a bushfire safety authority must be obtained prior to developing bushfire prone land for the purpose of a SFPP.

In order to determine whether the proposed development is bushfire-prone, and if so, which setbacks and other relevant Bush Fire Protection Measures (BFPM) will be appropriate, this assessment adheres to the methodology and procedures outlined in PBP 2006 and cl. 44 of the Rural Fire Regulation 2013 (RF Regulation 2013).

1.1 Site Particulars

Locality	3 Quarry Road and 4 Vineys Road, Dural, NSW
LGA	Hornsby Shire Council
Titles	Lot 2A DP158064 and Lot 1 DP230172
Area	The site is 29695m^2 in total.
Zoning	The site is zoned RU2 Rural Landscape under Hornsby Local Environmental Plan (LEP) 2013 (refer to Figure 2).
Boundaries	The site is situated within a rural residential and industrial area. Lots surrounding the site are a combination of garden plantations, rural residential properties, cleared lands, remnant vegetation and industrial buildings. Quarry road runs along the southern boundary of the site with Vineys Road running along the north.
Current Land Use	The site contains cleared lands associated with a rural residential property, a dwelling and individual vegetation.
Topography	The site is relatively flat with a lower lying drainage line running from the west down to the east across the centre of the site.
Climate / Fire History	The site lies within a geographical area with a Fire Danger Index (FDI) rating of 100. Extreme bushfire weather is therefore associated with long periods of drought, high temperatures, low humidity and gusty often north-westerly winds. A portion of Lot 1 DP230172 within the site is classified by Hornsby Council as Vegetation Buffer 100m and 30m on the Bushfire Prone Land Map (2014), refer to **Figure 3**.



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TITLE : FIGURE 1:SITE LOCATION

LOCATION : DURAL , NSW

DATUM:GDA 1994

PROJECTION: GDA 1994 MGA Zone 56

DATE : **30/04/2018**

PURPOSE: **BTA**

VERSION (PLAN BY): B A3 (Natalie.Wood)

PATH: J:\JOBS\139k\139898 Dural\10 - Drafting\Arcgis Map Documents\BTA\139898 Figure 1 Site Location B A3 20180430.mxd

CLIENT: **H INVESTMENTS INTERNATIONAL PTY LTD**

JOB REF: **PR139898**

RPS AUSTRALIA EAST PTY LTD (ABN 44 140 292 762)
241 DENISON STREET BROADMEADOW PO BOX 428 HAMILTON NSW 2303
T: 02 4940 4200 F: 02 4961 6794 www.rpsgroup.com.au

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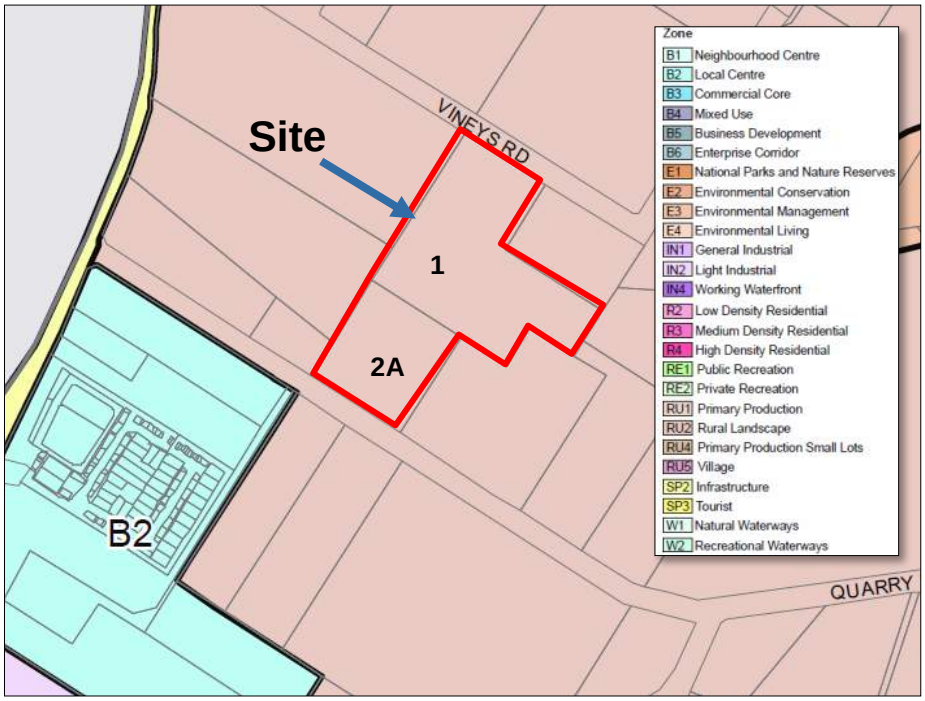


Figure 2 Hornsby LEP Land Zoning Map

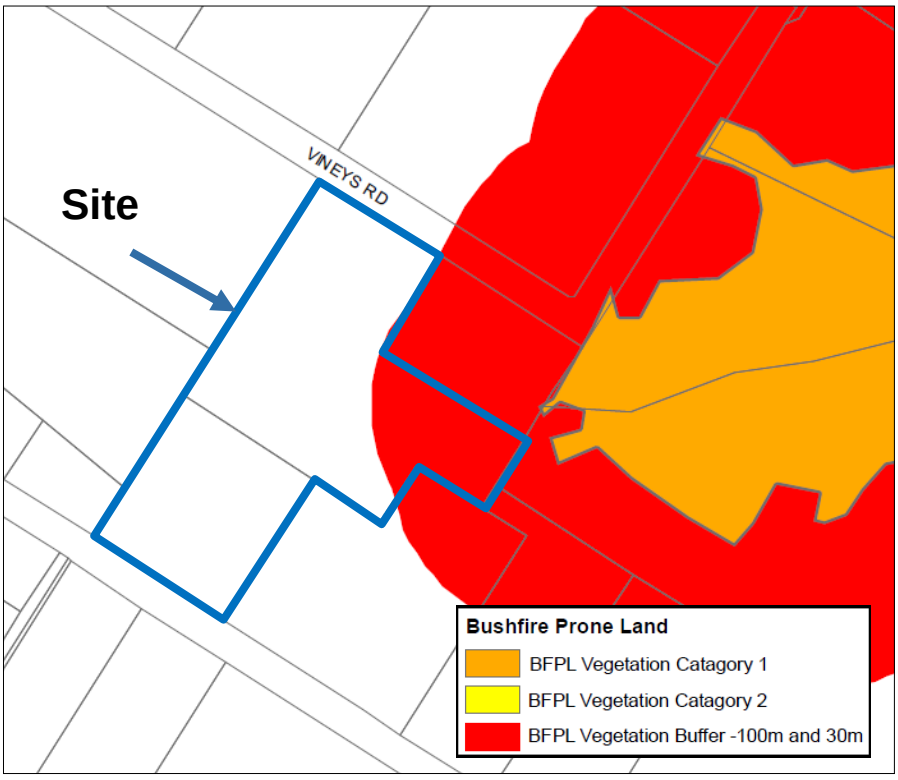


Figure 3 Bushfire Prone Land Map of the Site (Hornsby Council)

1.2 Description of Proposal

The proposed development comprises the construction of a residential aged care facility with a capacity of 74 beds as well as 145 self-care housing units contained within 8 three storey buildings (see Figures 4). The structures within the complex (buildings A-H) are classified as building class 9c and are required to adhere to the requirements of Special Fire Protection Purposes. An assembly building located in the east of the development footprint and is described in section 1.2.1. The development is intended to provide for a transitional environment for over 55s that can remain in the same development as their needs change with age. The development will allow for a variety of living arrangements with a variety of care options available to all residents.

The Concept Plan (29 May 2018) for the Project is contained in **Appendix 1**.

1.2.1 Assembly building (Wellness Centre)

An assembly building 'Wellness Centre' located in the east of the development footprint contains a gym, pool and change rooms and is classified as building class 9b. These types of developments should be considered on their own merits under s4.1.4 of the EP&A Act 1979, with consideration of the specific objectives listed in s4.2.3 of the PBP (2006). Design of this building has considered fire threat and construction material will consist of low flammable material to meet BAL 19 requirements.

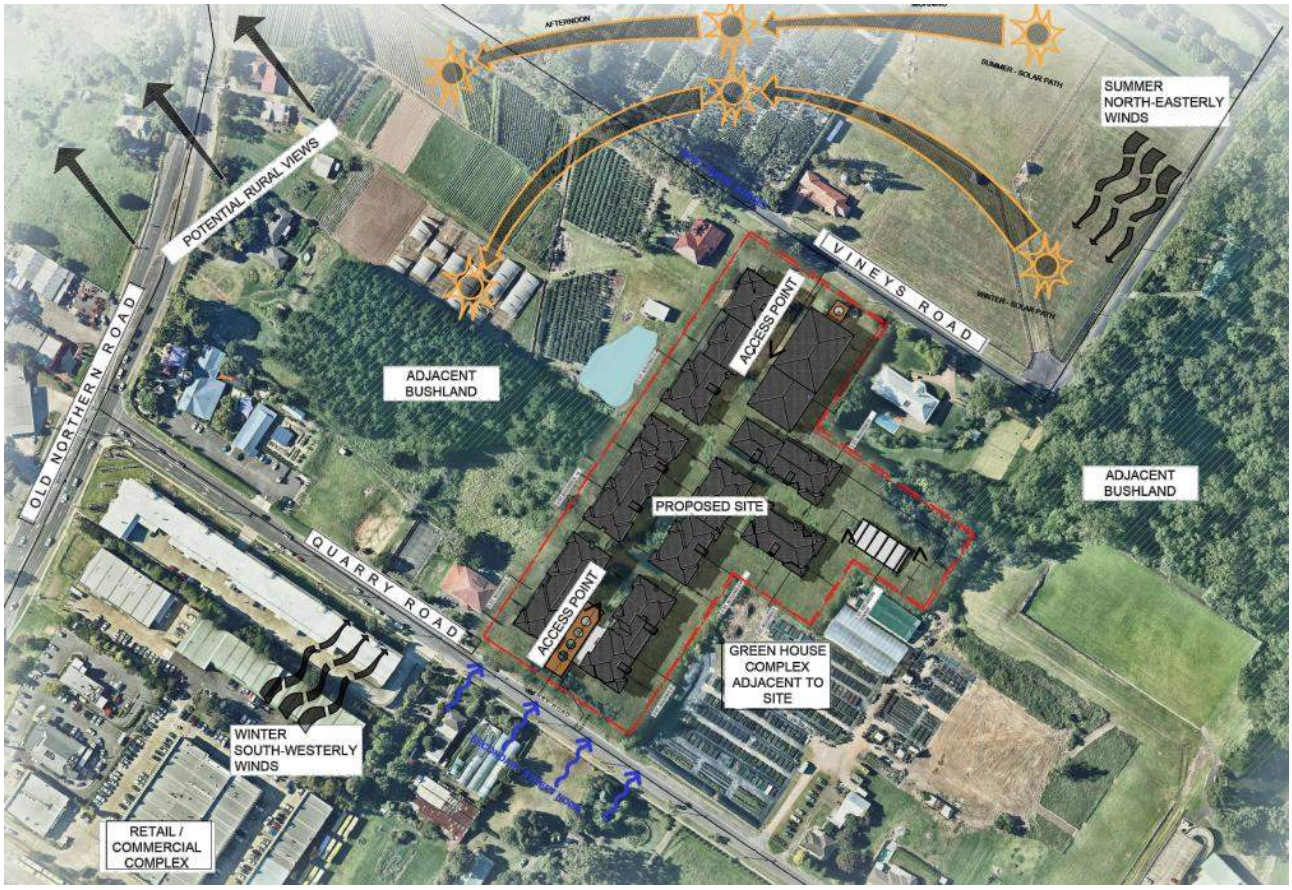


Figure 4 Site Analysis (Marches partners, 29 May 2018)

1.3 Objectives of Assessment

This assessment has been undertaken in accordance with Clause 44 of the RF Regulation. This BTA also addresses the six key Bush Fire Protection Measures (BFPMs) in a development assessment context being:

1. The provision of clear separation of buildings and bush fire hazards, in the form of fuel-reduced Asset Protection Zones (and their components being Inner Protection Areas and Outer Protection Areas);
2. Construction standards and design (Bushfire Attack Levels);
3. Appropriate access standards for residents, fire-fighters, emergency workers and those involved in evacuation;
4. Adequate water supply and pressure;
5. Emergency management arrangements for fire protection and / or evacuation; and
6. Suitable landscaping, to limit fire spreading to a building.

1.4 Specific Objectives for Special Fire Protection Purpose Developments

The aims and objectives listed in section 1.2.1 of PBP 2006 remain applicable to SFPP developments, however further consideration has been given to SFPP developments due to the nature of these environments and the occupants they accommodate. Occupants of SFPP developments are generally more vulnerable to bush fire attack therefore specific objectives have been put in place to ensure greater protection is provided (section 4.2.3 PBP 2006). Specific objectives include:

- To provide for the special characteristics and needs of occupants; and
- Provide for safe emergency evacuation procedures.

With the above in mind, consideration needs to be given to the appropriate Asset Protection Zone (APZ) for the circumstance. The intent of an APZ is to provide sufficient space for firefighters to safely operate while supporting or evacuating occupants. This can be achieved by ensuring firefighters and occupants are not exposed to radiant heat levels greater than 10kW/m^2 at the point of entry/ egress to the building.

It is noted that the published intent of APZs focuses on ensuring people are not exposed to excessive radiant heat levels. Neither the intent of measures nor the Performance Criteria refer to the 10kW/m^2 maximum radiant heat level also applying to buildings.

The Deemed-to-Satisfy (DTS) option to satisfy the Performance Criteria requires the provision of an APZ in accordance with PBP 2006; in this instance the DTS Acceptable Solution is equivalent to a 40m APZ to the east of the site.

Accordingly, an Alternate Solution may be developed to achieve the Performance Criteria by developing a fire safety strategy that contains Emergency Evacuation Procedures to require occupants to evacuate away from the bushfire threat.

2 Bushfire Hazard Assessment

2.1 Vegetation Assessment

2.1.1 Methodology

Vegetation classification over the site and surrounding area has been carried out as follows:

- Aerial photograph Interpretation to map the vegetation classification and extent;
- Site inspection (13th March 2018); and
- Reference to regional vegetation community mapping.

In accordance with PBP 2006, an assessment of the vegetation over a distance of 140m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified in all directions from the development footprint. The vegetation classification is based on the revised Table 2.3 in AS3959-2009.

2.1.2 Predominant Vegetation Formation

The determined vegetation classifications are displayed in **Table 1**. **Plates 1 – 6** depict the site and surrounding vegetation.

Table 1 Vegetation Classification

Direction of Bushfire Attack	Vegetation or other infrastructure	Classification of Vegetation Formations AS3959-2009	Overall Fuel Load (PBP 2006)
North	Rural residential and cleared lands, Vineys Road, rural gardens, small plantations and cleared lands	Exclusion – Low threat vegetation	NA
East	Disturbed area dominated by Lantana and other exotic weeds immediately on boundary of site	Rainforest	8-10 tonnes/ha
East	Forest vegetation commences 30m to the east beyond the Lantana.	Forest	15-25 tonnes/ha
South	Rural residential and cleared lands, industrial buildings, Quarry Road and existing	Exclusion – Low threat vegetation	NA
West	Rural residential and cleared lands, Gardens plantations	Exclusion – Plantation <1ha not within 100m of other vegetation being classified	NA

Vegetation to the east

There are two different vegetation formations to the east of the site that require classification. All vegetation is in a slight depression that forms the head of a drainage line into a creek system further to the east.

The vegetation on the site is forest that will be removed.

Immediately to the east of the site boundary, on Pacific Hills Christian School estate, the vegetation has been heavily disturbed (assumed during the construction of the adjacent school sports fields) and is heavily dominated by a variety of riparian weed species including Lantana (85%), Madeira vine (10%), wild Tobacco (5%) with scattered native disturbance species such as *Pteridium esculentum* on the edge of the exotic shrub growth (Plate 1). A concrete block retaining wall has been constructed to the north of this vegetation. The vegetation is between 1-3m in height and has a 100% canopy cover at shrub level. Heavy exotic vine growth is smothering any tree species. There is scattered (<5%) ground cover vegetation as the light can't penetrate to the surface. Surface and near-surface fire fuel are light and hold a high moisture content, with high levels of elevated and aerated fuels due to the exotic shrubs. The soils under this vegetation maintain a high moisture level. In consideration of NSW Rural Fire Service – Community Resilience Fast Facts 2/08 – Exotic Species, this community falls within # 3 Lantana (woody vine) classification. Lantana is declared a woody weed and control is not considered feasible. The soils are fertile and alluvial in nature and full sunlight which provide perfect opportunity for Lantana to dominate. Table 1 - Exotic vegetation types and the corresponding native vegetation type NSW Rural Fire Service – Community Resilience Fast Facts 2/08 – Exotic Species indicates that this vegetation with a canopy cover >70% can be classified as '*Rainforest'.*

Evidence on the site suggests that the area now dominated by Lantana was once cleared of all vegetation to construct a retaining wall, potentially at the same time as the development of the Pacific Hills Christian School sporting fields to the south. Lantana has colonised the area and now dominates.

Heavily timbered vegetation exists a further 30m to the east of the site boundary, beyond the lantana and in association with the private property boundary of Pacific Hills Christian School. The trees are native to a height of 20-30m, closed canopy and 1-2m moderate shrub level. This vegetation is transitional between dry sclerophyll forest that would have occupied the drier slope where urban development currently exists and wet sclerophyll forest within the wet riparian gullies and creeks of the Hawkesbury catchment. This vegetation is classified as *Forest* for this assessment.

The vegetation in the background behind the scrub in Plate 2 are isolated trees 50m further to the north (Figure 5). Plate 1 and 2 below illustrate the vegetation within this area to the east of the site.

Vegetation to the west

The plantation to the west of the site is less than 1 hectare in size and not within 100m of any other vegetation being classified and is therefore considered to be a low threat vegetation and therefore excluded from this assessment. In consideration however of this vegetation a perimeter road on the western side of the development is proposed to provide separation (Appendix A). Furthermore, this perimeter road is greater than 100m from the bushfire threat and is not required to comply with the requirements of PBP (2006).

Vegetation to the North

An isolated tree exists on the property to the north which is identified in Figure 6. The managed lawns associated with the dwelling to the north extend south to the base of this tree. The 'Rainforest' vegetation (as classified above) commence at the eastern drip-line of this tree. The mapped area of the 'Rainforest' takes this into consideration when calculating BAL levels as identified in Figure 6.

Plate 1 **Scrub vegetation on Pacific Hills Christian School to the east of the site**

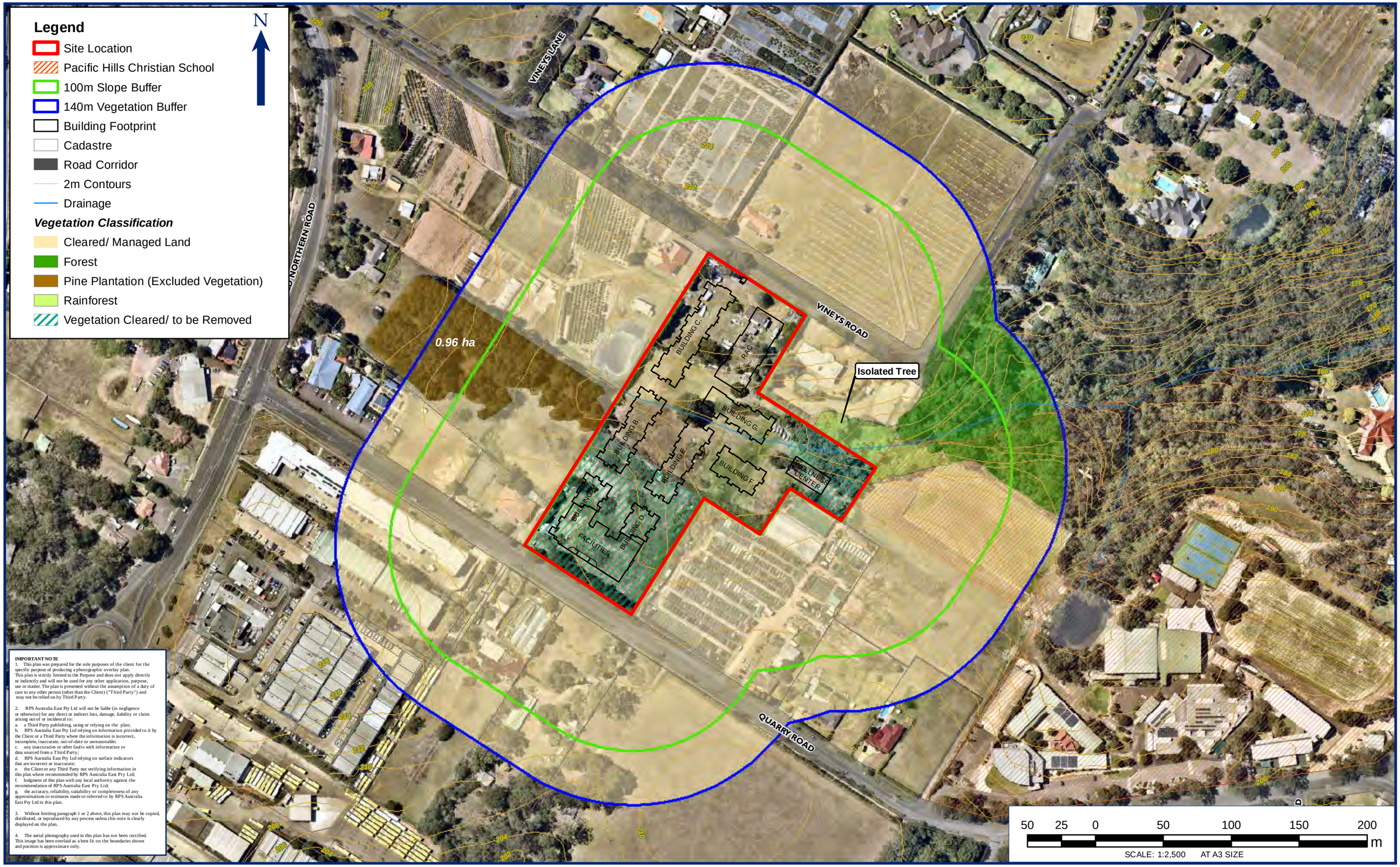
Plate 2 **Forest and Rainforest vegetation on eastern boundary of site (Trees behind rainforest vegetation are isolated and a further 50m to the north)**

Plate 3 NORTH: Rural residential and cleared lands, Vineys Road

Plate 4 EAST: Remnant vegetation and small scale garden industry

Plate 5 SOUTH: Rural residential and cleared lands, Quarry Road

Plate 6 WEST: Rural residential and cleared lands, Gardens plantations



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TITLE : FIGURE 5: VEGETATION CLASSIFICATION

LOCATION : DURAL , NSW

DATUM:GDA 1994

PROJECTION: GDA 1994 MGA Zone 56

DATE : **30/04/2018**

PURPOSE: **BTA**

VERSION (PLAN BY): C A3 (Natalie.Wood)

PATH: J:\JOBS\139k\139898 Dural\10 - Drafting\Arcgis Map Documents\BTA\139898 Figure 6 Veg Calssification C A3 20180430.mxd

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241 DENISON STREET BROADMEADOW PO BOX 428 HAMILTON NSW 2303
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2.2 Effective Slope Assessment

2.2.1 Methodology

Slope assessment has been undertaken as follows:

- Aerial photography;
- Detail survey; and
- Site inspection (13th March 2018).

An assessment of the slope over a distance of 100m of the hazard direction from the site boundary was undertaken. The effective slope was then calculated under the classified vegetation. The topography of the site and surrounds has been evaluated to identify both the average slope and the maximum slope present under classified vegetation. These values help determine the vegetation that possess bushfire threat and significantly influence fire behavior.

2.2.2 Effective Slope

The effective slope of the bushfire hazard is documented in **Table 2** below.

Table 2 Site Slope Assessment

Direction of Vegetation	Hazard	Slope Classification
North	Exclusion – Low threat vegetation	Upslope
East	Rainforest	4.5° Downslope
East	Forest	4.5° Downslope
South	Exclusion – Low threat vegetation	Upslope
West	Exclusion – Plantation* <1ha not within 100m of other vegetation	Upslope

2.3 Significant Environmental Features

Given the disturbed nature of the site, no significant environmental features occur.

2.4 Significant Threatened Species

A search of the Atlas of NSW Wildlife Database was conducted on 13th March 2018. The Atlas includes records of threatened species listed under both the NSW *Biodiversity Conservation* Act 2017 and the Commonwealth *Environment Protection and Biodiversity Conservation* Act 1999. No threatened species have been recorded on the site.

2.5 Cultural Significance

A search of The Aboriginal Heritage Information Management System (AHIMS) (Appendix 2) confirmed that there are no records of Aboriginal or Cultural Heritage places on the site.

2.6 Bushfire Risk Management

The RF Act requires each bushfire management committee to prepare a bushfire risk management plan for a nominated area; commonly defined by local government area boundaries. The Hornsby/Ku-ring-gai Bushfire Management Committee developed the Hornsby/Ku-ring-gai Bush Fire Risk Management Plan (BFRMP) which was endorsed in April 2016 and approved in March 2017. The BFRMP investigated the high risk human settlements in the Hornsby Local Government Area and ranked them according to the assessed bushfire risk and the likely consequence of a bushfire attack.

BFRMPs are often not site specific, and individual sites or development do not have a statutory obligation to prepare a BFRMP, however it is often recommended as part of preparedness, a BFRMP is prepared.

Hornsby/Ku-ring-gai Bush Fire Risk Management Plan

Bushfire Management Zones were identified within the BFRMP to identify the management intent for a specific area. A description of the different bushfire management zones are described in **Table 3** below.

Table 3 Bushfire Management Zones

Zone	Purpose	Suppression Objective(s)	Zone Characteristics
Asset Protection Zone (APZ)	To protection human life, property and highly valued public assets and values.	To enable the safe use of Direct Attack suppression strategies within the zone. To minimise bush fire impacts on undefended assets.	As per RFS document *Standards for Asset Protection Zones.*
Strategic Fire Advantage Zone (SFAZ)	To protection human life, property and highly valued public assets and values. To provide strategic areas of fire protection advantage which will reduce the speed and intensity of bushfires and reduce the potential for spot fire development.	To improve the likelihood and safe use of: **Parallel Attack** suppression strategies with the zone. To enable the safe use of **Indirect Attack** (back burning) in high to very high fire weather conditions within the zone. To prevent crown fire development within the zone; and/or To minimise spot fire ignition potential from the zone.	Zone width related to suppression objectives and dependent upon: • Topography; • Aspect; • Spotting propensity; • Location of adjacent firebreaks; • Mosaic pattern of treatment; Assess Overall Fuel Hazard (OFH) once vegetation communities reach minimum fire thresholds within this plan. Management practises should aim to achieve mosaic fuel reduction patterns so that the majority of the SFAZ has an OFH of less than high.
Land Management Zone (LMZ)	To meet relevant land management objectives in areas where APZs or SFAZs are not appropriate.	As per the land management and fire objectives of the responsible land management agency. To reduce the likelihood of spread of fires. To undertake mosaic burning.	As appropriate to achieve land management eg. heritage and/or fire protection eg. broad scale mosaic burning objectives.
Fire Exclusion Zone (FEZ)	To exclude bushfires	N/A	Variable dependant on size of fire sensitive area requiring protection.

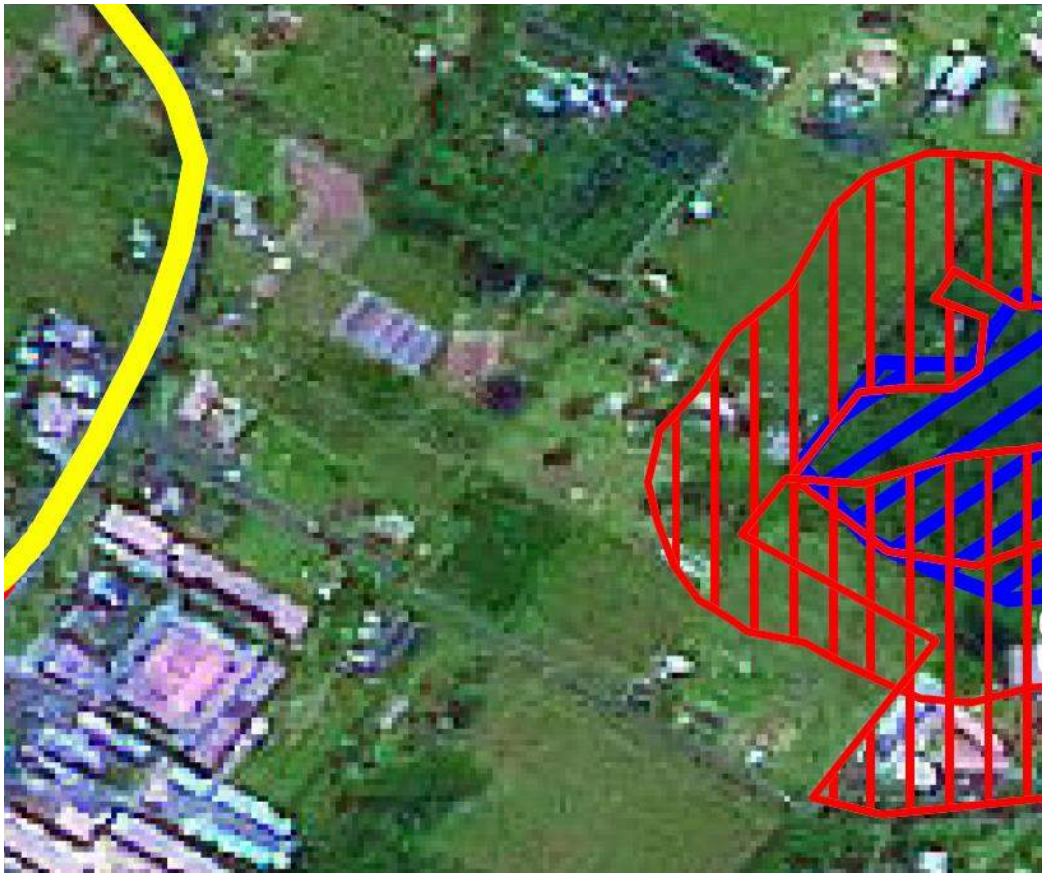


Figure 6 Hornsby Bushfire Risk Management Plan

Figure 6 displays the context of the site in relation to other assets included in the BFRMP. The yellow line is Old Northern Road to the west of the site, the red hatching represents Human Residential, and the blue hatching is Strategic Fire Advantage Zone of the vegetation to the east of the site.

The Hornsby/Ku-ring-gai BFMC includes a series of Asset Specific Treatment available for implementation at any particular site exposed to a bushfire threat. **Table 4** describes the available treatment actions.

Table 4 Asset specific treatments used in the Hornsby/Ku-ring-gai BFMC area

Strategy	Targeted treatments used in the BFMC
Ignition Management	• Maintain vegetation as per Network Management Plan
Hazard Reduction	• Undertake mosaic burning in SFAZ • Undertake mosaic burning in LMZ • Inspect APZ(s) annually and maintain as required • Inspect SFAZ annually and maintain as required • Manage vegetation to reduce fuel load • Maintain fuels in accordance with Guidelines

Strategy	Targeted treatments used in the BFMC
Community Engagement	• Manage CFU as per NSWFB policy • Undertake community engagement activities • Develop, maintain & promote CPP
Property Planning	• Develop/implement/review bushfire emergency plan • Implement precinct emergency management plan • Maintain building if required by inspection
Preparedness	• Inspect trails annually and maintain as required • Manage facilities to reduce risk
Other	• Manage asset per Heritage requirements

3 Bushfire Protection Measures

3.1 Asset Protection Zones

An APZ is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property. The required width of the APZ varies with slope and the type of hazard. An APZ can consist of both an Inner Protection Area (IPA) and an Outer Protection Area (OPA). The respective IPA and OPA widths for the required APZs are as detailed in **Table 5 and 6**. An APZ can include the following:

- footpaths;
- lawns;
- discontinuous gardens;
- swimming pools;
- driveways;
- unattached non-combustible garages with suitable separation from the dwelling;
- open space / parkland; and
- car parking.

Isolated areas of vegetation are generally not a bushfire hazard as they are not large enough to produce fire of an intensity that will threaten dwellings. These areas include narrow strips of vegetation along road corridors.

3.1.1 Determining the appropriate setbacks

The site lies within the Hornsby LGA and therefore is assessed under a FDI rating of 100. The Detailed Assessment (Method 1) outlined in Australian Standard AS3959-2009 Construction of buildings in bushfire prone areas was used to calculate the required setback to achieve BAL-19 or the class 9b wellness centre (assembly building) and BAL-10 for the entry / exit of each of the class 9c residential Special Fire Protection Purpose buildings A-H.

Refer to **Table 5 and 6** for required APZs.

3.2 Building Design and Construction

The determinations of the appropriate Bushfire Attack Level (BAL) are based upon parameters such as weather modelling, fire-line intensity, flame length calculations, as well as vegetation and fuel load analysis. The determination of the construction level is derived by assessing the:

- Relevant FDI = 100
- Flame temperature = 1200K
- Slope
- Vegetation classification; and
- Building location.

Performance criteria outlined in section 4.2.7 of PBP 2006 for SFPP developments state that radiant heat levels of greater than 10kW/m^2 will not be experienced by occupants or emergency services workers entering or exiting a building. Additionally, exits are to be located away from the hazard side of the building.

3.2.1 Bushfire Attack Level for the Proposed Development

PBP (2006) requires minimum setbacks to be established for Special Fire Protection Purposes in accordance with Table A2.6. These areas are considered Asset Protection Zones and provide a space between the hazard and asset to undertake suppression operations and defend the asset from bushfire attack. Separate bushfire attack levels have been assessed for the class 9c residential SFPP buildings A-H, and the class 9b assembly building. In accordance with PBP (2006) a 40m APZ is required for 0-5° effective slopes under rainforest vegetation formation. Table 5 and 6 calculate the separation distances in consideration of BAL ratings.

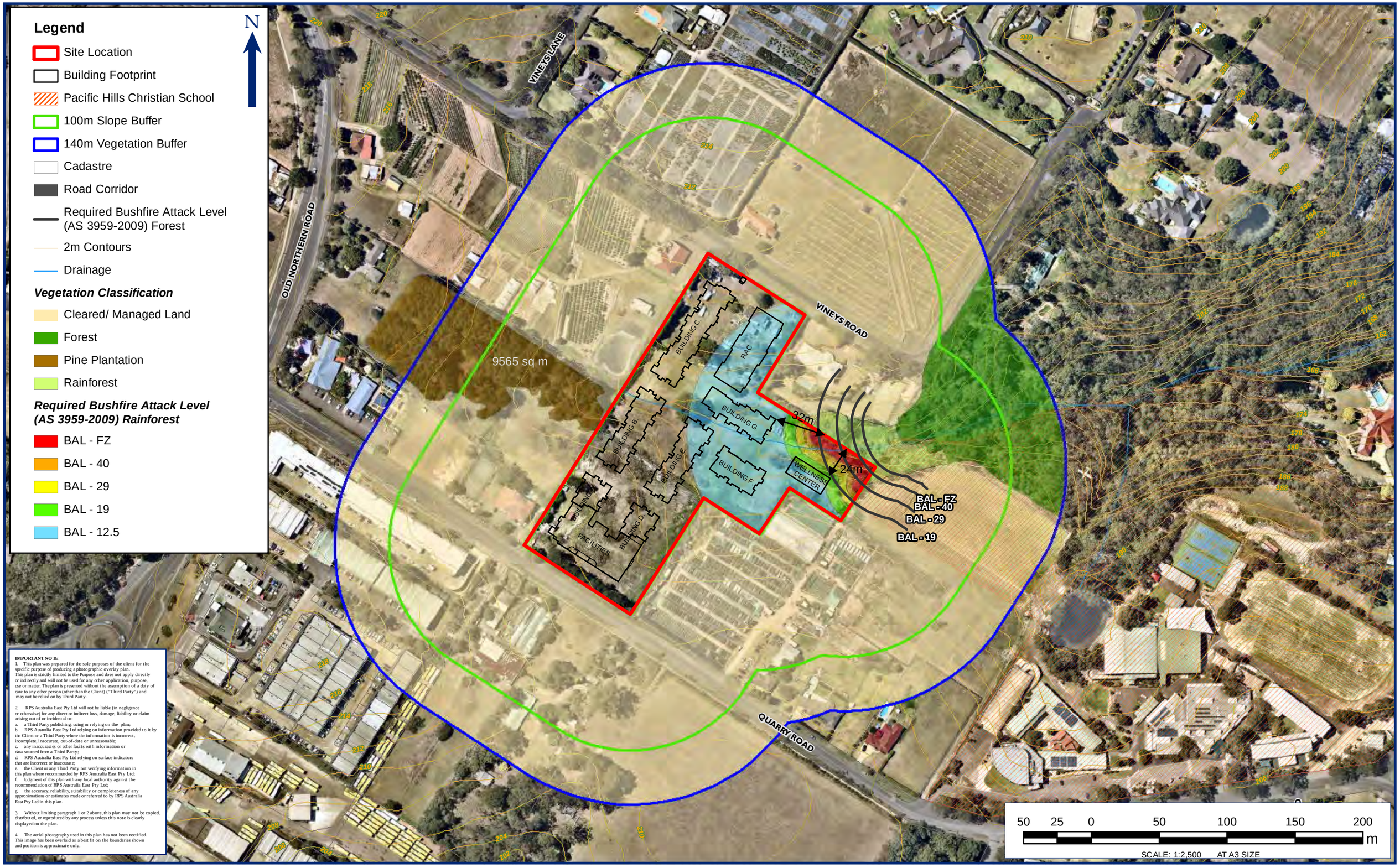
Refer to **Table 6** and **Figure 6** for the APZ calculated for the site in accordance with PBP (2006)

Table 5 Separation distances for class 9c residential SFPP buildings A-H

Direction of Hazard	Vegetation Classification	Average slope of land in degrees	Separation Distance from Threat (SFPP develop)	Bushfire Attack Level (BAL)
East	Rainforest	4.5° Downslope	32m	BAL – 12.5
East	Forest	4.5° Downslope	145m	BAL - LOW

Table 6 Separation distances for class 9b assembly building

Direction of Hazard	Vegetation Classification	Average slope of land in degrees	Separation Distance from Threat	Bushfire Attack Level (BAL)
East	Rainforest	4.5° Downslope	24m	BAL – 19
East	Forest	4.5° Downslope	52m	BAL - 19



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TITLE : FIGURE 7: REQUIRED BAL (AS3959-2009 METHOD 2)

LOCATION : DURAL , NSW

DATUM:GDA 1994

PROJECTION: GDA 1994 MGA Zone 56

DATE : **30/04/2018**

PURPOSE: **BTA**

VERSION (PLAN BY): D A3 (Natalie.Wood)

PATH: J:\JOBS\139k\139898 Dural\10 - Drafting\Arcgis Map Documents\BTA\139898 Figure 8 Required BAL D A3 20180430.mxd

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3.3 Access

In the event of a serious bushfire threat to the proposed development, it will be essential to ensure that adequate ingress/ egress and the provision of defendable space are afforded in the building design.

Two ingress and egress points to the site are situated off Vineys Road to the north and Quarry Road to the south. Access will provide a through road that dissects the site entirely and contains a roundabout intersection with Quarry road to slow internal traffic.

In addition to vehicle access, all pedestrian paths should be clearly signposted to direct evacuating occupants towards the main building during emergency situations. Development outside 100m of the classified vegetation and bushfire threat have not been assessed in accordance with the requirements of PBP (2006). Development within 100m of the classified vegetation (bush fire threat) has been assessed in accordance with PBP (2006). This includes Building F, G H, RAC, assembly building, eastern portion of Building E and the associated access infrastructure. The associated access infrastructure includes the access road from Quarry road to the administration office and the continuation of that road to the assembly building. Refer to Appendix A for the architectural plans displaying access and Appendix C for Traffic Plan. The following summarises the access requirements of PBP 2006 for SFPP developments and how the development meets alternative solution requirements:

- **Be two-wheel drive, sealed, all weather roads;**

Vehicle access from the visitor car park to the assembly building will be two-wheel drive, sealed, all weather and complies with PBP 2006 in this regard.

- **Internal perimeter roads are provided with at least two traffic lane widths (carriageway 8m minimum kerb to kerb) and shoulders on each side;**

The development does not meet acceptable solution of PBP (2006). The Traffic Plan prepared by GTA Consultants in 2018 (Appendix C) has an alternate solution to facilitate emergency services access. Internal and perimeter roads are between 5.3 to 4 meters wide with passing bays each 100m. Each passing bay is in line of sight of the passing bay in both directions. Shoulder of the road shall be constructed to facilitate passing and signage erected to indicate no road side parking is allowed.

- **Roads are through roads. Dead end roads are not more than 100 metres in length from a through road, incorporate a minimum 12 metres outer radius turning circle, and area clearly sign posted as a dead end;**

The development does not meet acceptable solution of PBP (2006). The Traffic Plan prepared by GTA Consultants in 2018 (Appendix C) has an alternate solution to facilitate emergency services access. The Internal and perimeter road is longer than 100m and 8.6m cul-de-sac (turning circle) is provided at the dead end. It is recommended that appropriate signage be installed and the turning circle be increased to 12m in accordance with PBP (2006) to accommodate fire-fighting appliances.

- **Traffic management devices are constructed to facilitate access by emergency service vehicles;**

The installation of appropriate traffic management devices such as:

  - Passing bays established every 40m and in line of sight to the next passing bay;
  - Road shoulders that facilitate passing vehicles;
  - Appropriate signage indicating dead end and no parking be established.

- **A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches is provided;**

The development meets acceptable solution of PBP (2006) and provides for clearances.

- **Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress**;

The development meets acceptable solution of PBP (2006) and provides for minimum inner radius. Refer to Appendix C for traffic plan that considers emergency services access.

- **The minimum distance between inner and outer curves is six meters;**

The development does not meet acceptable solution of PBP (2006). The Traffic Plan prepared by GTA Consultants in 2018 (Appendix C) has an alternate solution to facilitate emergency services access. Internal and perimeter roads are between 5.3 to 4 meters wide. The combination of the traffic management devised recommended will facilitate emergency service vehicle egress. Refer to Appendix C for traffic plan that considers emergency services access.

- **Maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees;**

The development meets acceptable solution of PBP (2006) and provides for appropriate grades.

- **Cross fall of pavement is not more than 10 degrees;**

The development meets acceptable solution of PBP (2006) and provides for appropriate cross falls.

- **Roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge);**

No wetlands of lands subject to periodic inundation are within the development.

- **Roads are clearly sign-posted;**

The installation of appropriate traffic management signage, indicating dead end and no parking to be established will result in compliance with PBP (2006)

- **The internal road surfaces and bridges have capacity to carry fully-loaded firefighting vehicles (15 tonnes).**

The development meets acceptable solution of PBP (2006) and provides for appropriate road capacities.

3.4 Water

Associated with any kind of development upon the land, it is expected that water mains will be extended into the site. Provision of access to this supply should be provided for fire-crews in the form of readily accessible and easily located fire hydrants. Fire hydrant spacing, sizing and pressure should comply with AS 2419.1 – 2005. Hydrants are not to be located within any road carriageway. All above ground water and gas service pipes external to the building are metal, including and up to any taps.

3.5 Gas

Any reticulated or bottled gas should be installed and maintained according to the requirements of the relevant authorities and AS 1596 – 2002. It is expected that the location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.

3.6 Firefighting Capacity

To facilitate quick and efficient action by the Fire Brigade / Rural Fire Service upon arrival, it is recommended that all necessary connections / pumps etc. be clearly marked and visible, and in good working order. Dural Rural Fire Brigade is located 1.2 km east of the site on Quarry Road.

3.7 Landscaping

Landscaping should be designed and managed to minimise flame contact and radiant heat to buildings and the potential for wind driven embers to cause ignitions.

In choosing plants for landscaping, consideration should be given to plants that possess properties, which help to protect buildings. If the plants themselves can be prevented from ignition, they can improve the defence of buildings by:

- filtering out wind-driven burning debris and embers;
- acting as a barrier against radiation and flame; and
- reducing wind forces.

Consequently, landscaping of the site should consider the following:

- meet the specifications of an Inner Protection Area (IPA) detailed in PBP 2006;
- priority given to retaining or planting species which have a low flammability and high moisture content;
- priority given to retaining or planting species which do not drop much litter in the bushfire season and which do not drop litter that persists as ground fuel in the bush fire season; and
- create discontinuous or gaps in the vegetation to slow down or break the progress of fire towards the dwellings.

3.8 Fuel Management

Careful thought must be given to the type and physical location of any proposed site landscaping. Inappropriately selected and positioned vegetation has the potential to ‘replace’ any previously removed fuel load.

Bearing in mind the desired aesthetic and environment sought by site landscaping, some basic principles have been recommended to help minimise the chance of such works contributing to the potential hazard on site.

Whilst it is recognised that fire-retardant plant species are not always the most aesthetically pleasing choice for site landscaping, the need for adequate protection of life and property requires that a suitable balance between visual and safety concerns be considered.

It is reiterated again that it is essential that any landscaped areas and surrounds are subject to ongoing fuel management and reduction to ensure that fine fuels do not build up.

3.9 Emergency Evacuation Management

The occupants of SFPP developments are often more vulnerable to bushfire attack as they are less familiar with their surroundings and may be less educated in relation to bush fire impacts. Furthermore, these residents are less likely to be able to defend the property from bushfire attack. It is imperative that evacuation management is clearly defined to ensure that harm to employees and occupants and loss of life does not occur.

It is recommended that an Emergency Management Plan (EMP) be developed to outline all actions and procedures for occupants of the site in the event of an emergency bushfire. The EMP should consider the distance and time required to evacuate to the nearest potential off site refuge area when determining the preferred emergency management procedure. A Shelter-in-Place refuge area might be a more acceptable solution in unforeseen bushfire emergencies. The EMP should have regard to the RFS guidelines 'Development Planning: A guide to developing a Bush Fire Emergency Management and Evacuation Plan' (2014).

The EMP should be circulated to all employees and they should be made aware that on days when the RFS decide the Fire Danger Rating is Catastrophic, emergency evacuation should be made a priority.

Due to the nature of the development it is recommended that an annual emergency simulation exercise is undertaken by all employees of the resort to satisfy local emergency services and prepare all personnel for a possible fire event.

4 Conclusion and Recommendations

It is clear from this investigation and assessment that the site constitutes Bushfire Prone Land. In accordance with the provisions of PBP 2006, the recommendations outlined within this assessment will substitute as appropriate actions to reduce the risk of damage and/or harm in the event of a bushfire event.

This BTA found the land surrounding the proposed development to support vegetation consistent with a combination of Rainforest and Forest as described by PBP 2006. A perimeter road exists along the western boundary providing a defendable space between the low-threat pine plantation. The entrances and exits of all building comply with 10kw/m^2 requirement within the PBP (2006).

In summary, the following key recommendations have been generated to enable the proposed development to comply with PBP 2006:

- The entire development site is to be managed as an inner protection area (IPA) as outlined with section 4.1.3 and Appendix 5 of 'Planning for Bushfire Protection 2006 and the NSW Rural Fire Services' document 'Standards for Asset Protection Zones';
- All proposed structures to be built on the site should have due regard to the specific considerations given in the BCA, which makes specific reference to the Australian Standard (AS3959 – 2009) Construction of buildings in bushfire prone areas;
  - Building G within the class 9c residential SFPP buildings shall comply with Sections 3 and 5 (BAL-12.5) AS3959-2009 and section A3.7 Addendum Appendix 3 of 'Planning for Bush Fire Protection 2006';
  - The entire "Wellness Centre" assembly building class 9b shall comply with Sections 3 and 6 (BAL-19) AS3959-2009 and section A3.7 Addendum Appendix 3 of 'Planning for Bush Fire Protection 2006';
- Internal roads are to be constructed in accordance with PBP 2006 or alternate solution as outlined in section 3.3 of this report, specifically:
  - It is recommended the turning circle be increased to 12m in accordance with PBP (2006) to accommodate fire-fighting appliances.
  - The installation of appropriate traffic management devised such as construction of road shoulders that facilitate passing vehicles, shrub vegetation not be established in the side of the road between the administration building and assemble building to facilitate line of sight between passing bays and vehicle passing in general, and appropriate road side signage for dead-end, no parking, and passing bays be established.
- Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site especially the provision of defendable space between the assembly building and bush fire hazard to the east;
- A minimum 1.8-metre-high radiant heat shield made of non-combustible materials shall be constructed along the eastern and northern boundary adjacent to the assembly building. All posts and rails shall be constructed of steel. The bottom of the fence is to be in direct contact with the finished ground level or plinth.
- The proposed facility is to be linked to the existing mains pressure water supply and that suitable hydrants be clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure should comply with AS2419.1, 2005;

- A hydrant will be located to the north-western corner of the wellness centre, adjacent, but not restricting the use of the turn-around bay or access to the northern side of the wellness centre to provide dedicated static water supply to responding fire services;
- A Bush Fire Emergency Management and Evacuation Plan shall be prepared consistent with 'Development Planning A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan December 2014' and Australian Standard AS3745 2010 'Planning for Emergencies in Facilities'. Attention within this plan should focus on the procedure to evacuate and close the assemble area in the event of a bushfire attack.

This assessment has been made based on the bushfire hazards in and around the site at the time of inspection and production (March 2018).

Finally, the implementation of the adopted measures and recommendations forwarded within this report are based on a thorough assessment under the Planning for Bushfire Protection 2006 to manage the risk caused by bushfire to people, property and public safety. The recommended bushfire protection measures will contribute to the amelioration of the potential impact of any bushfire upon the development estate, but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

5 Bibliography

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Appendix A

Concept Plan

DEVELOPMENT APPLICATION
RETIREMENT VILLAGE_3 QUARRY RD, DURAL

DRAWINGS REGISTER

DWG No.	TITLE	REVISION
DA0.00 PRELIMINARIES		
DA0.00	COVER SHEET	F
DA1.00 SITE PLANS		
DA1.01	SITE PLAN	F
DA1.03	SURVEY	F
DA1.04	SITE ANALYSIS	F
DA1.05	ENVELOPE COMPARISON	F
DA1.06	STAGING PLAN	F
DA1.07	DEMOLITION PLAN	F
DA2.00 FLOOR PLANS		
DA2.01	KEYPLAN - BASEMENT -3	F
DA2.02	KEYPLAN - BASEMENT -2	F
DA2.03	KEYPLAN - BASEMENT -1	F
DA2.04	GROUND FLOOR	F
DA2.05	LEVEL 1	F
DA2.06	LEVEL 2	F
DA2.07	ROOF PLAN	F
DA2.08	PLAN SECTION - ZONE 1 RL 199.85	F
DA2.09	PLAN SECTION - ZONE 1 RL 203.00	F
DA2.10	PLAN SECTION - ZONE 1 RL 206.10	F
DA2.11	PLAN SECTION - ZONE 1 RL 209.20	F
DA2.12	PLAN SECTION - ZONE 1 RL 212.30	F
DA2.13	PLAN SECTION - ZONE 2 RL 197.00	F
DA2.14	PLAN SECTION - ZONE 2 RL 199.90	F
DA2.15	PLAN SECTION - ZONE 2 RL 203.00	F
DA2.16	PLAN SECTION - ZONE 2 RL 206.10	F
DA2.17	PLAN SECTION - ZONE 2 RL 209.20	F
DA2.18	PLAN SECTION - ZONE 3 RL 197.00	F
DA2.19	PLAN SECTION - ZONE 3 RL 200.00	F
DA2.20	PLAN SECTION - ZONE 3 RL 204.00	F
DA2.21	PLAN SECTION - ZONE 3 RL 207.00	F
DA2.22	PLAN SECTION - ZONE 3 RL 210.00	F
DA2.23	PLAN SECTION - ZONE 4 RL 195.70	F
DA2.24	PLAN SECTION - ZONE 4 RL 199.00	F
DA2.25	PLAN SECTION - ZONE 4 RL 202.10	F
DA2.26	PLAN SECTION - ZONE 4 RL 205.20	F
DA2.27	PLAN SECTION - ZONE 4 RL 208.30	F
DA2.28	PLAN SECTION - ZONE 5 RL 197.50	F
DA3.00 ELEVATIONS		
DA3.01	ELEVATIONS QUARRY RD & VINEYS RD	F
DA3.03	ELEVATIONS NORTH & SOUTH	F
DA4.00 SECTIONS		
DA4.01	SECTION AA	F
DA4.02	SECTION BB	F
DA4.03	SECTION CC	F
DA4.05	SECTIONS 1, 2, 3	F
DA5.00 DIAGRAMS		
DA5.01	SOLAR ACCESS - GROUND FLOOR	F
DA5.02	SOLAR ACCESS - LEVEL 1	F
DA5.03	SOLAR ACCESS - LEVEL 2	F
DA5.04	CROSS VENTILATION GF	F
DA5.05	CROSS VENTILATION L1	F
DA5.06	CROSS VENTILATION L2	F
DA5.07	SHADOW DIAGRAM 9 AM	F
DA5.08	SHADOW DIAGRAM 12 PM	F
DA5.09	SHADOW DIAGRAM 15 PM	F
DA7.00 VIEWS AND MATERIAL BOARD		
DA7.01	PERSPECTIVE VIEW FROM QUARRY RD	F
DA7.02	PERSPECTIVE VIEW FROM VINEYS RD	F
DA7.03	PERSPECTIVE VIEW NORTH ELEVATION	F
DA7.04	MATERIAL BOARD	F

DEVELOPMENT DATA

	UNIT MIX					AREA ILUS		
LEVEL	TWO BED	TWO BED+STUDIO	THREE BED	SUB TOTAL	RAC	NSA m²	GFA m²	GBA m2 (balconies not included)
G	12	11	21	44	16	4973	5720	6286
1	14	11	26	51	29	5773	6602	7255
2	14	11	26	51	29	5773	6629	7285
3	0	0	0	0	0	0	0	0
TOTAL	40	33	73	146	74	16519	18951	20825
	27%	23%	50%			87%	91%	-

FSR				
SITE m²	TOTAL GFA m²	FSR RESIDENTIAL X:1	FSR RAC X:1	TOTAL FSR X:1
29695	24537	0.64	0.13	0.83

	INDEPENDENT LIVING UNITS			RAC	FACILITIES	WELLNESS CENTER	CRAFTS ROOM
LEVEL	NSA m²	GFA m²	GBA m2 (balconies not included)	GFA m²	GFA m²	GFA m²	GFA m²
G	4973	5720	6286	577	1396	405	50
1	5773	6602	7255	1223	-	-	-
2	5773	6629	7285	1276	-	-	-
3	0	0	0	659	-	-	-
TOTAL	16519	18951	20825	3735	1396	405	50
RATIO	87%	91%	-	-	-	-	-

PARKING (ACCORDING TO CLIENT BRIEF)

INDEPENDENT LIVING UNITS				RAC			
PARKING TYPE	RATE	REQUIRED SPACES	PROPOSED SPACES	PARKING TYPE	RATE	REQUIRED SPACES	PROPOSED SPACES
2 BED	1	40		BEDROOM	0.1	6.9	17
2 BED+S	2	66		EMPLOYEE	0.5	12.5	29
3 BED	2	146		TOTAL		19.4	46
RESIDENTIAL SUBTOTAL		252	279				
VISITOR	0.2	0	44				
DISABLE			14				
TOTAL		252	337				

SITE LOCATION N.T.S.

PERSPECTIVE VIEW N.T.S.

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PROJECT
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DRAWING TITLE
COVER SHEET

SCALE	DATE	DRAWN	CHECKED
NTS ----	29/05/2018	CS	EB
JOB 16033	DRAWING DA0.00		REVISION F

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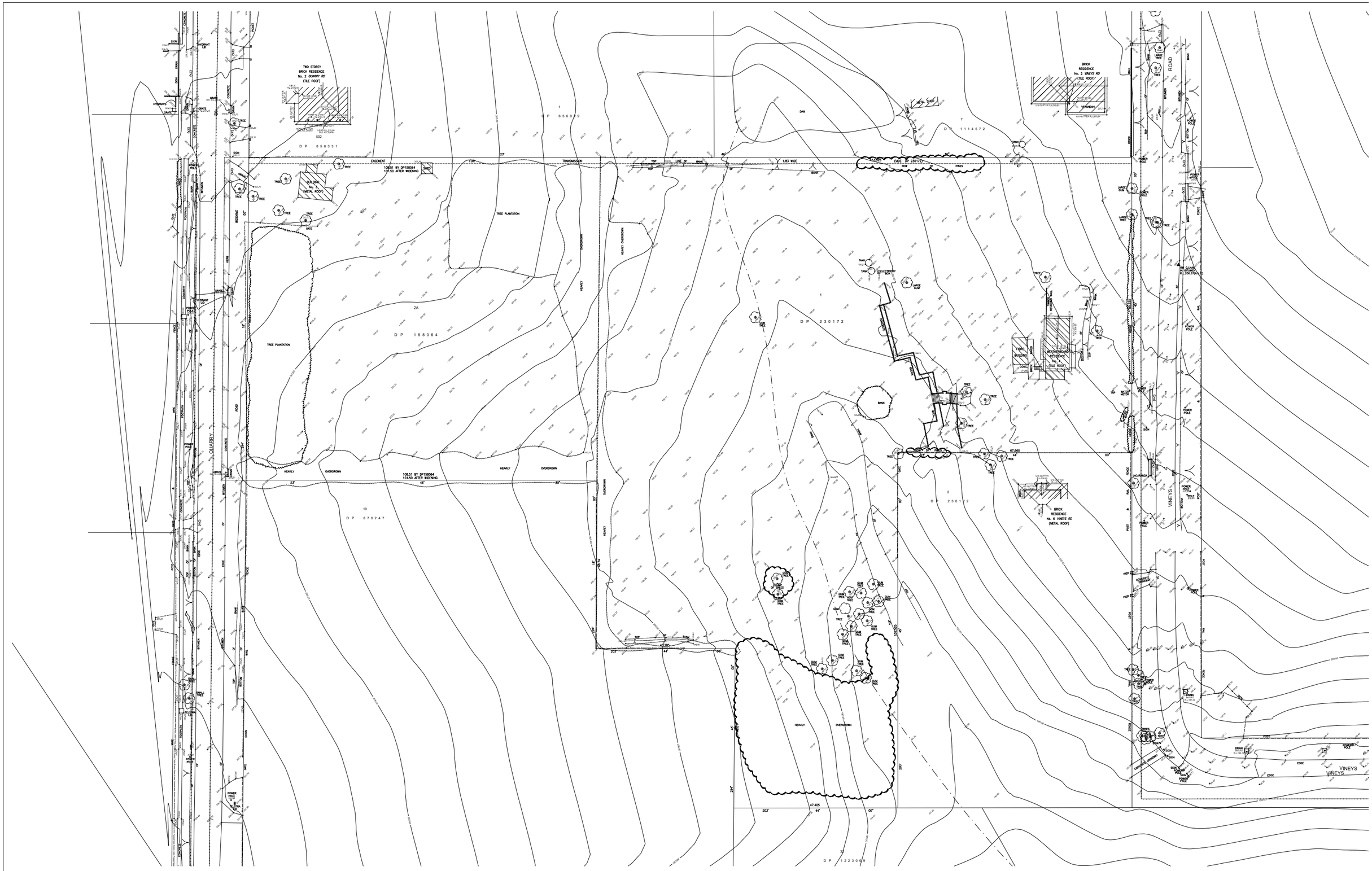

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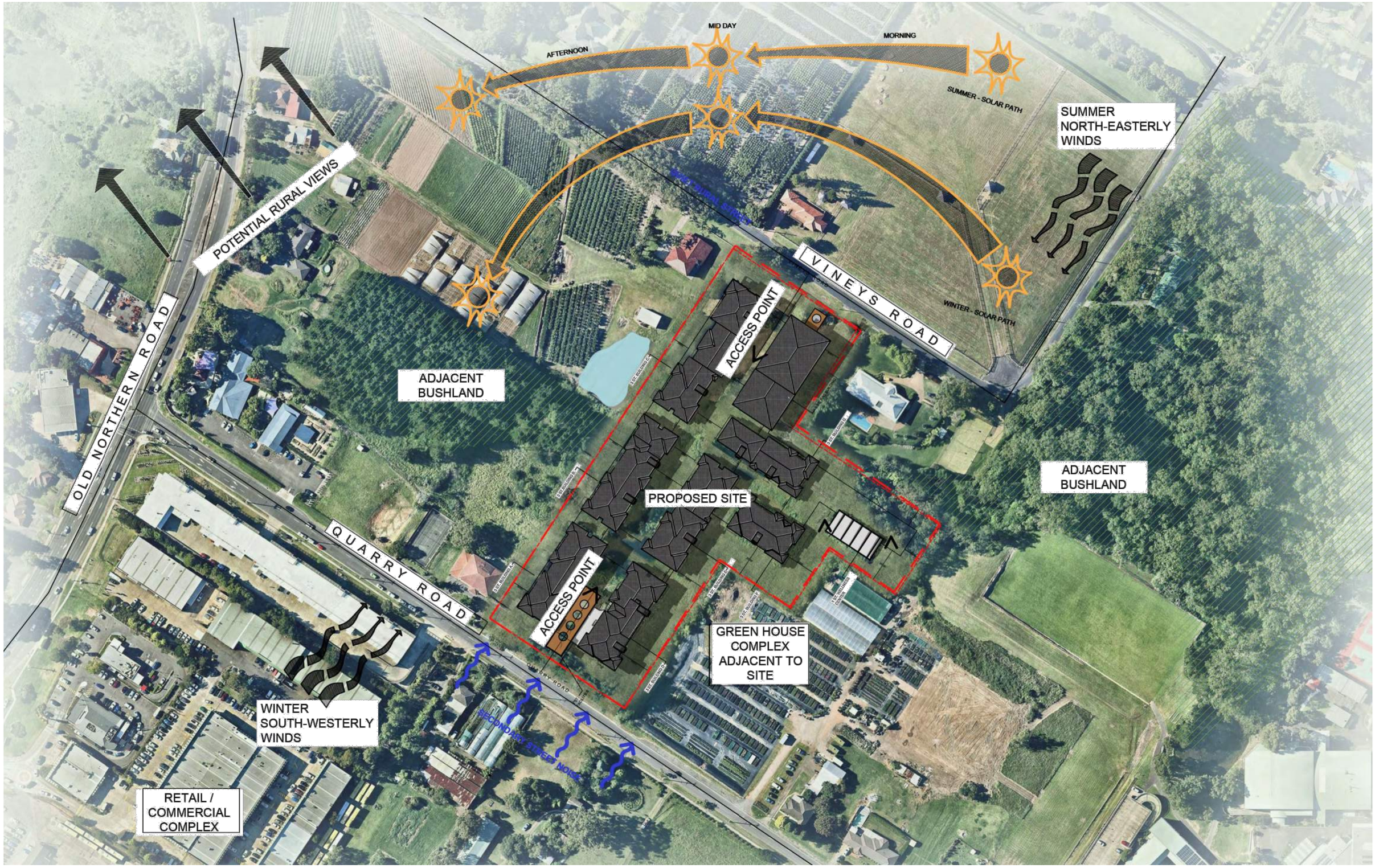

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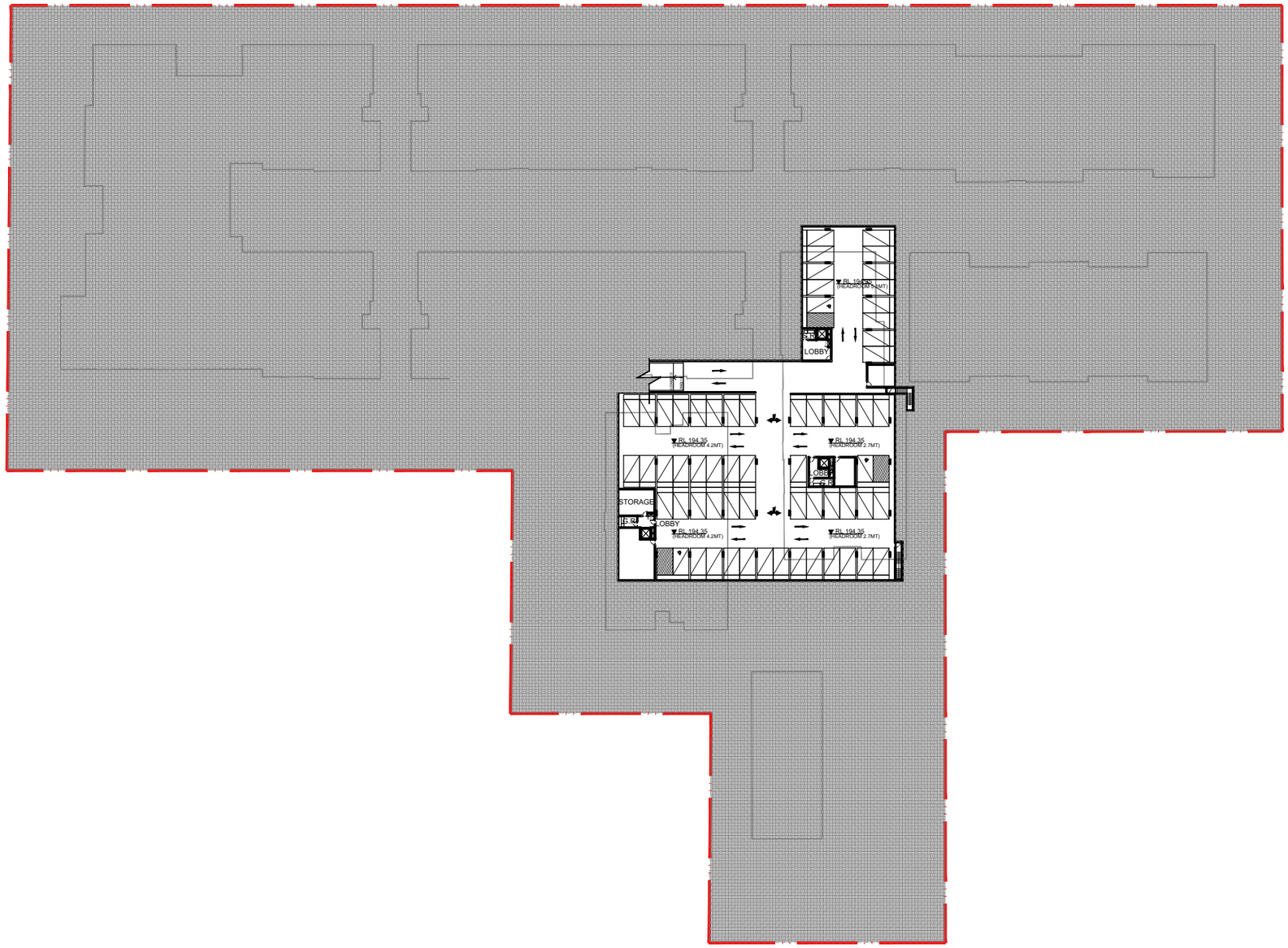

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KEYPLAN - BASEMENT -3

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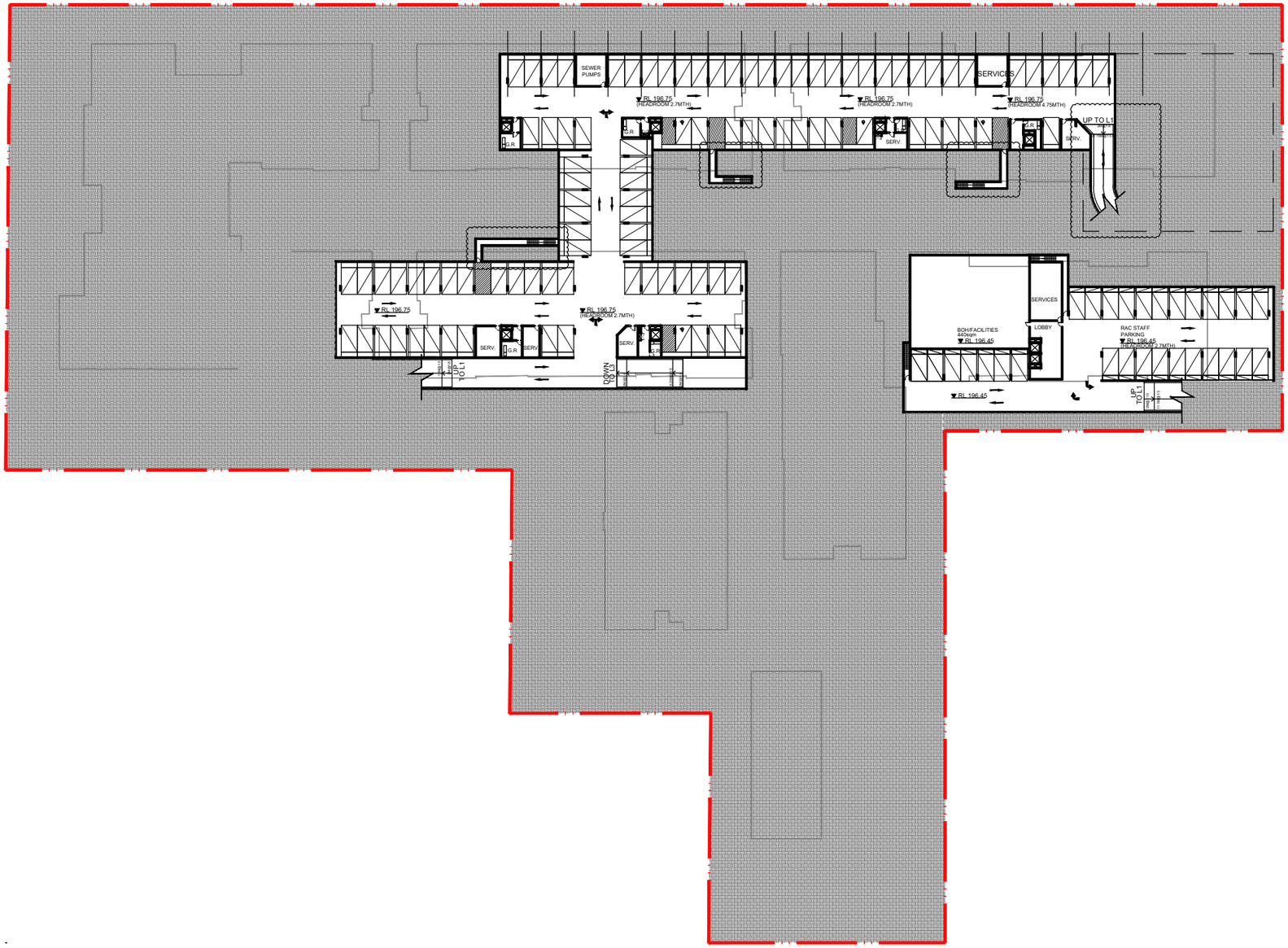

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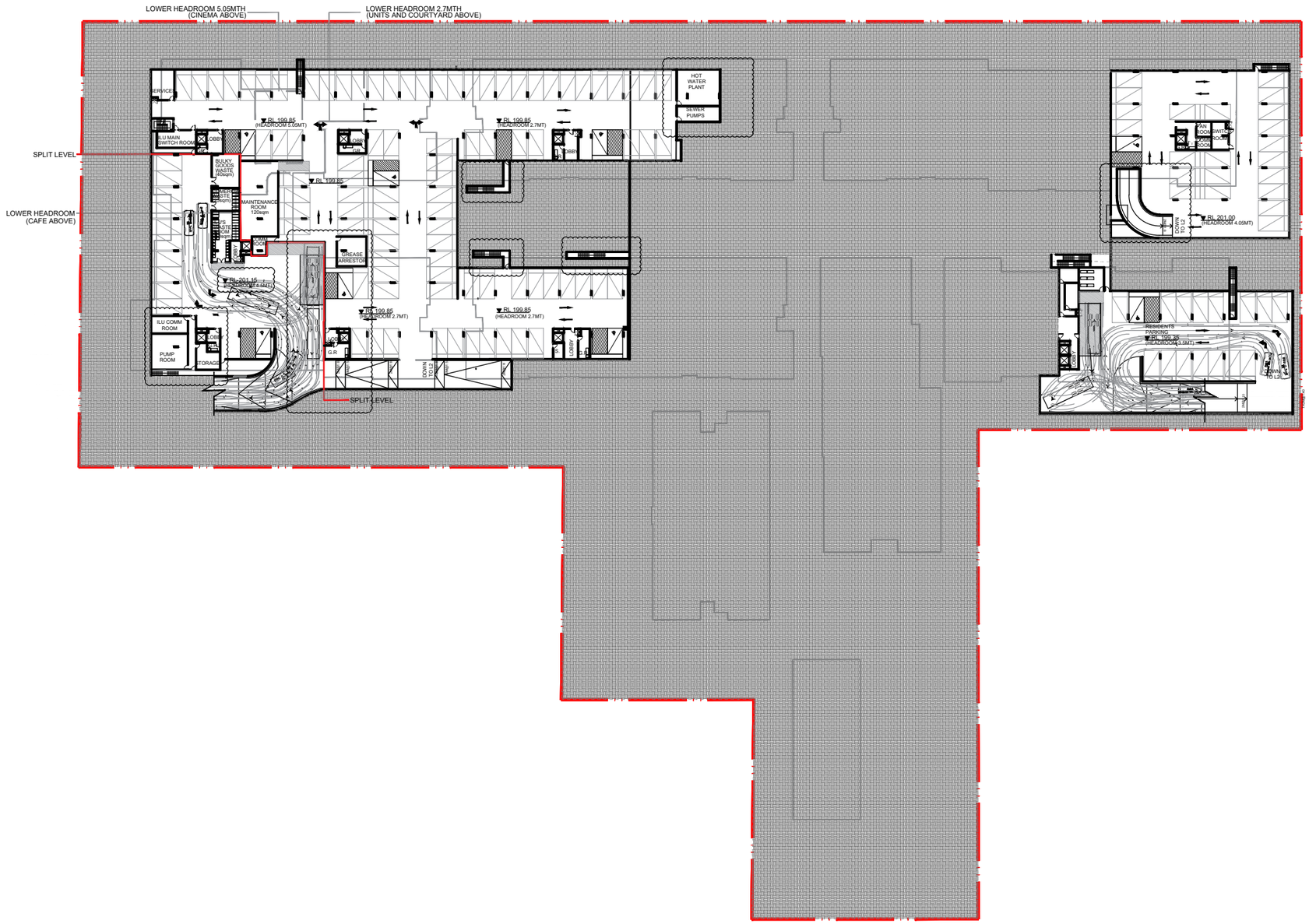

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DRAWING TITLE
LEVEL 1

PROJECT
3 Quarry Rd, Dural

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JOB	DRAWING	REVISION
16033	DA2.05	F

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CLIENT
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DRAWING TITLE
LEVEL 2

PROJECT
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JOB	DRAWING	REVISION
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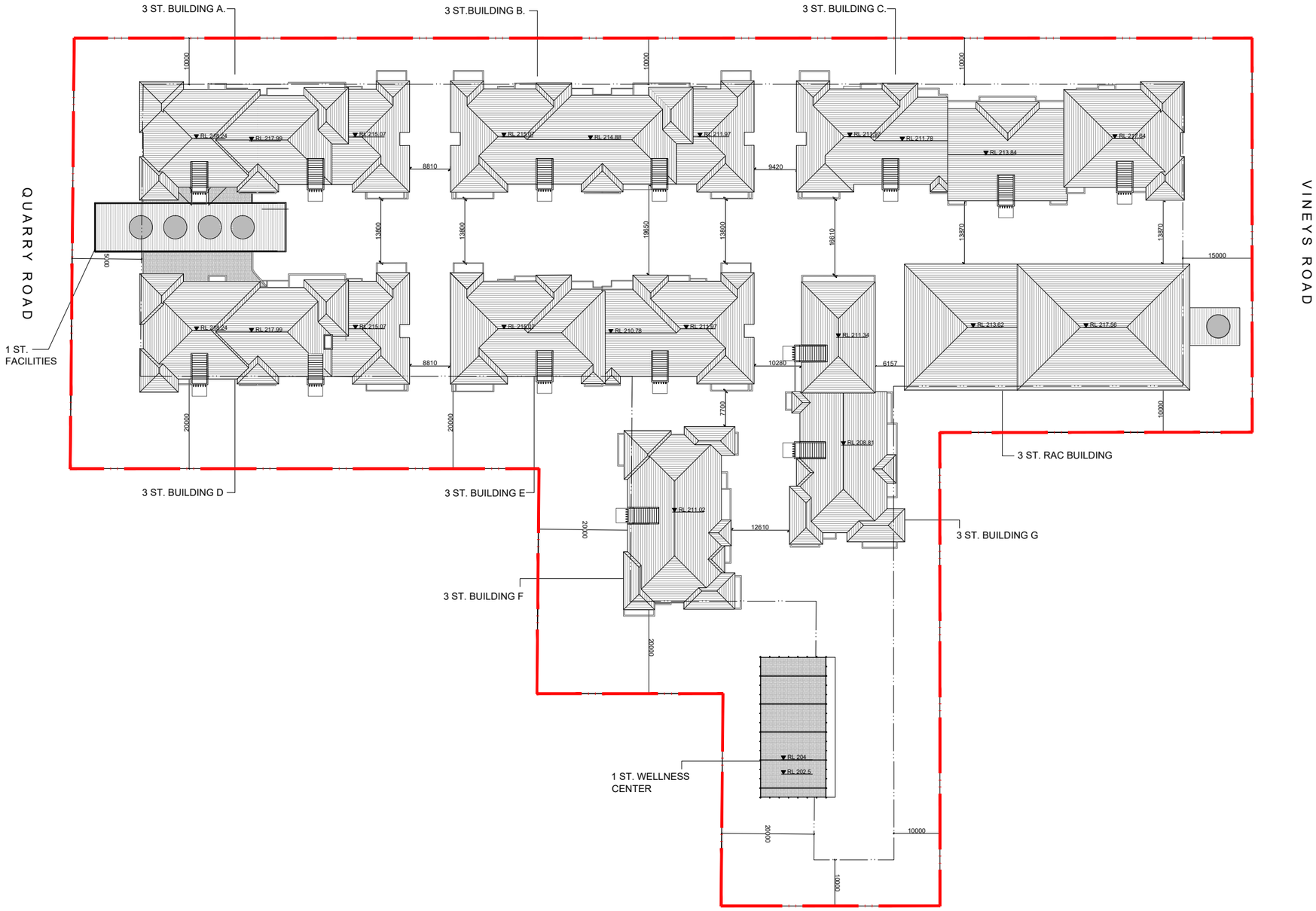

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PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
ROOF PLAN

SCALE	DATE	DRAWN	CHECKED
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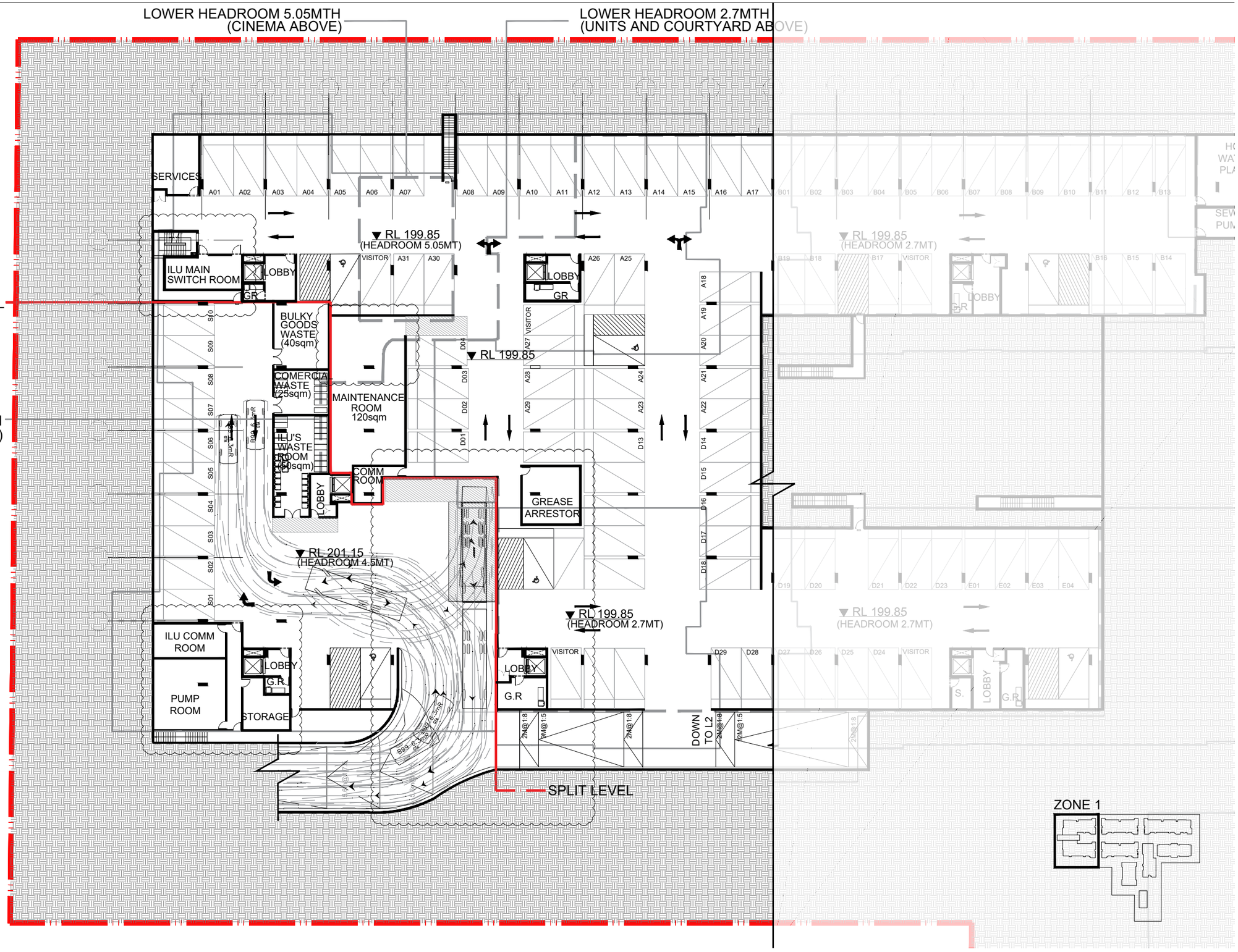
JOB	DRAWING	REVISION
16033	DA2.07	F



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REVISION	DATE	DESCRIPTION	BY
A	2018.03.17	ISSUED FOR COORDINATION	CS
B	2018.04.04	ISSUED FOR COORDINATION	CS
C	2018.04.12	ISSUED FOR COORDINATION	CS
D	2018.04.26	ISSUED FOR COORDINATION	CS
E	2018.05.11	ISSUED FOR COORDINATION	CS
F	2018.05.23	ISSUED FOR COORDINATION	CS

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PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
PLAN SECTION - ZONE 1 RL 199.85

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JOB	DRAWING		REVISION
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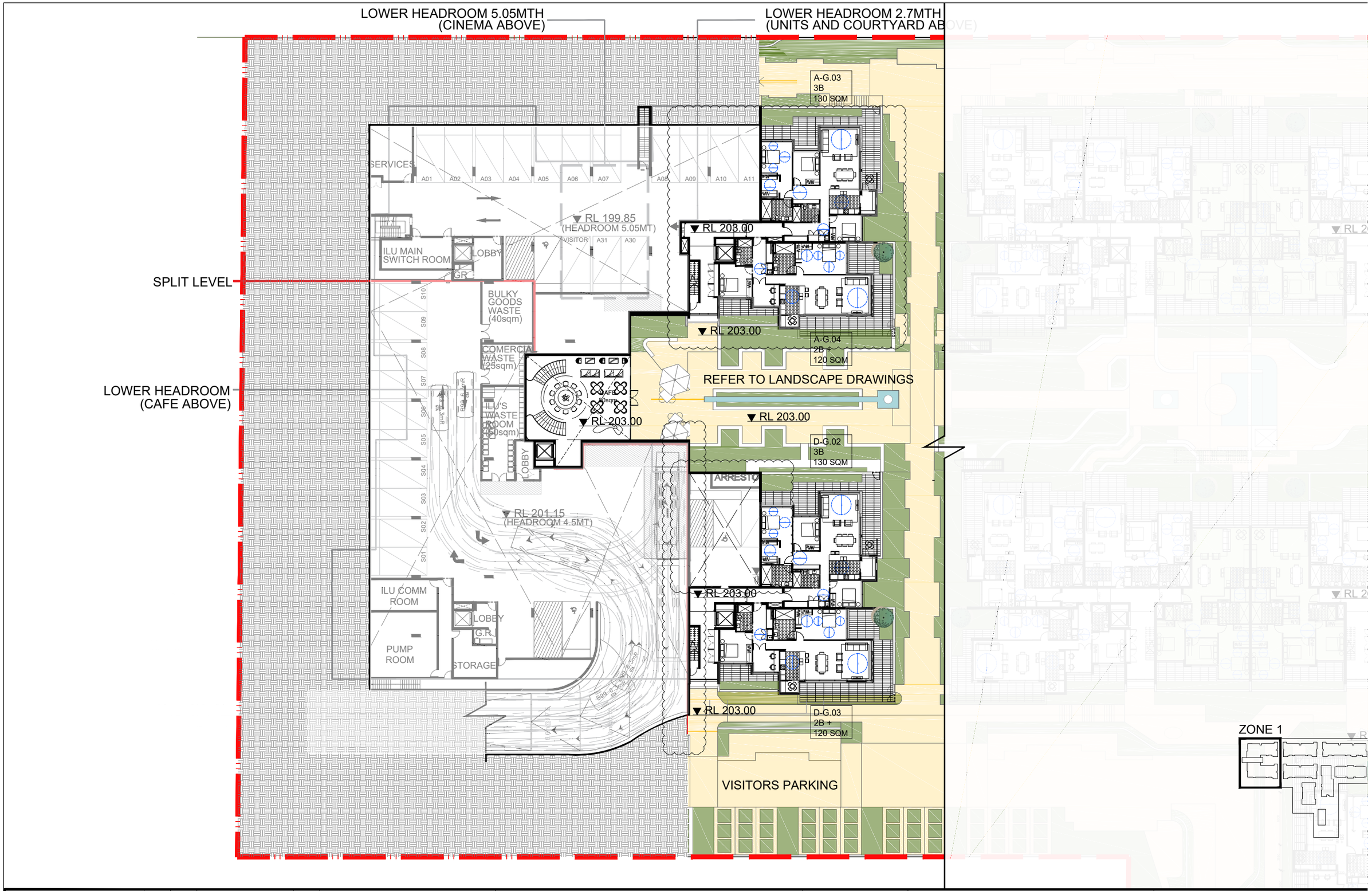

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E	2018.05.11	ISSUED FOR COORDINATION	CS
F	2018.05.23	ISSUED FOR COORDINATION	CS

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PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
PLAN SECTION - ZONE 1 RL 203.00

SCALE	DATE	DRAWN	CHE
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JOB	DRAWING	REVI
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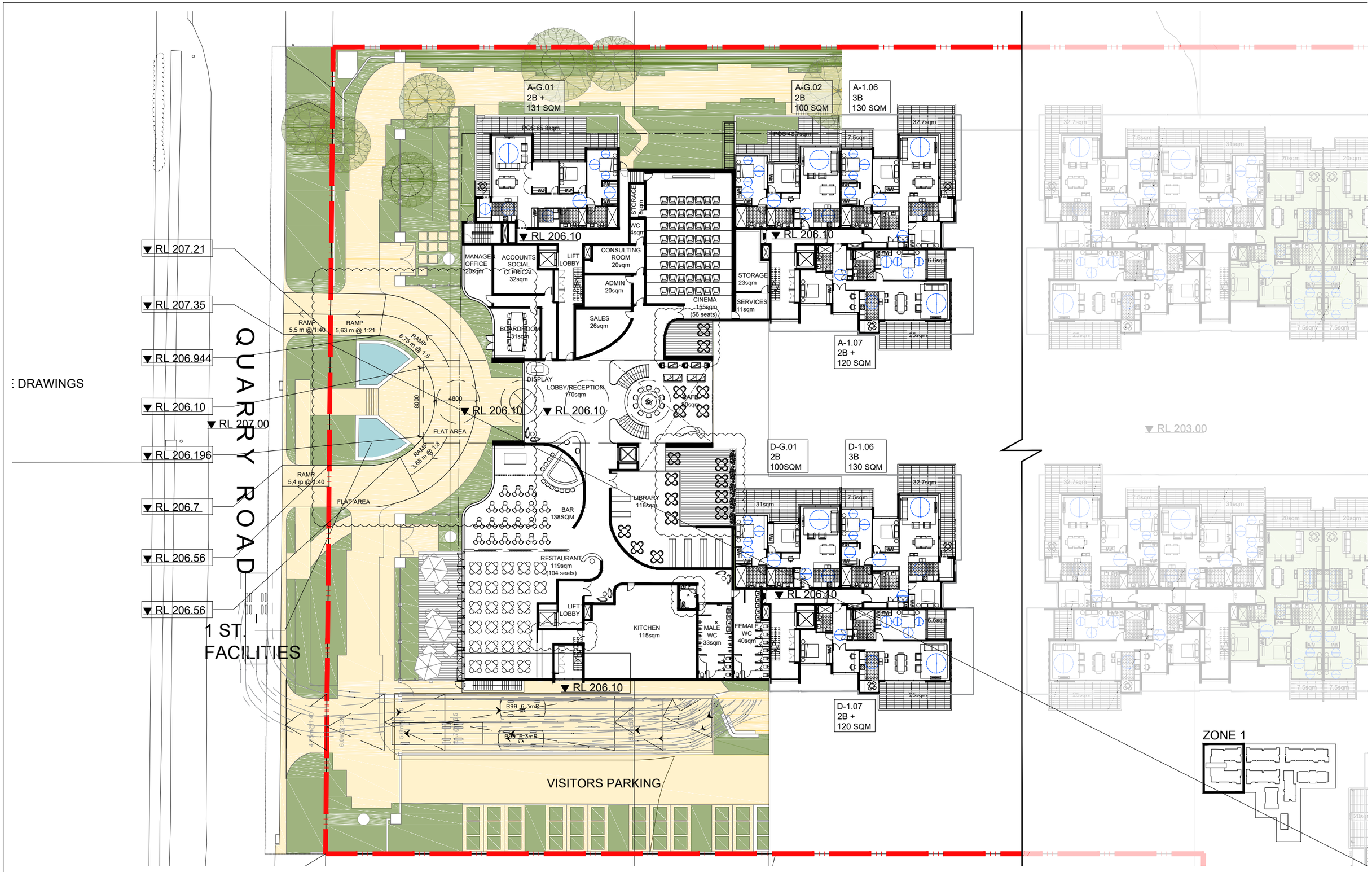

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PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
PLAN SECTION - ZONE 1 RL 206.10

SCALE	DATE	DRAWN	CHECKED
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JOB	DRAWING		REVISION
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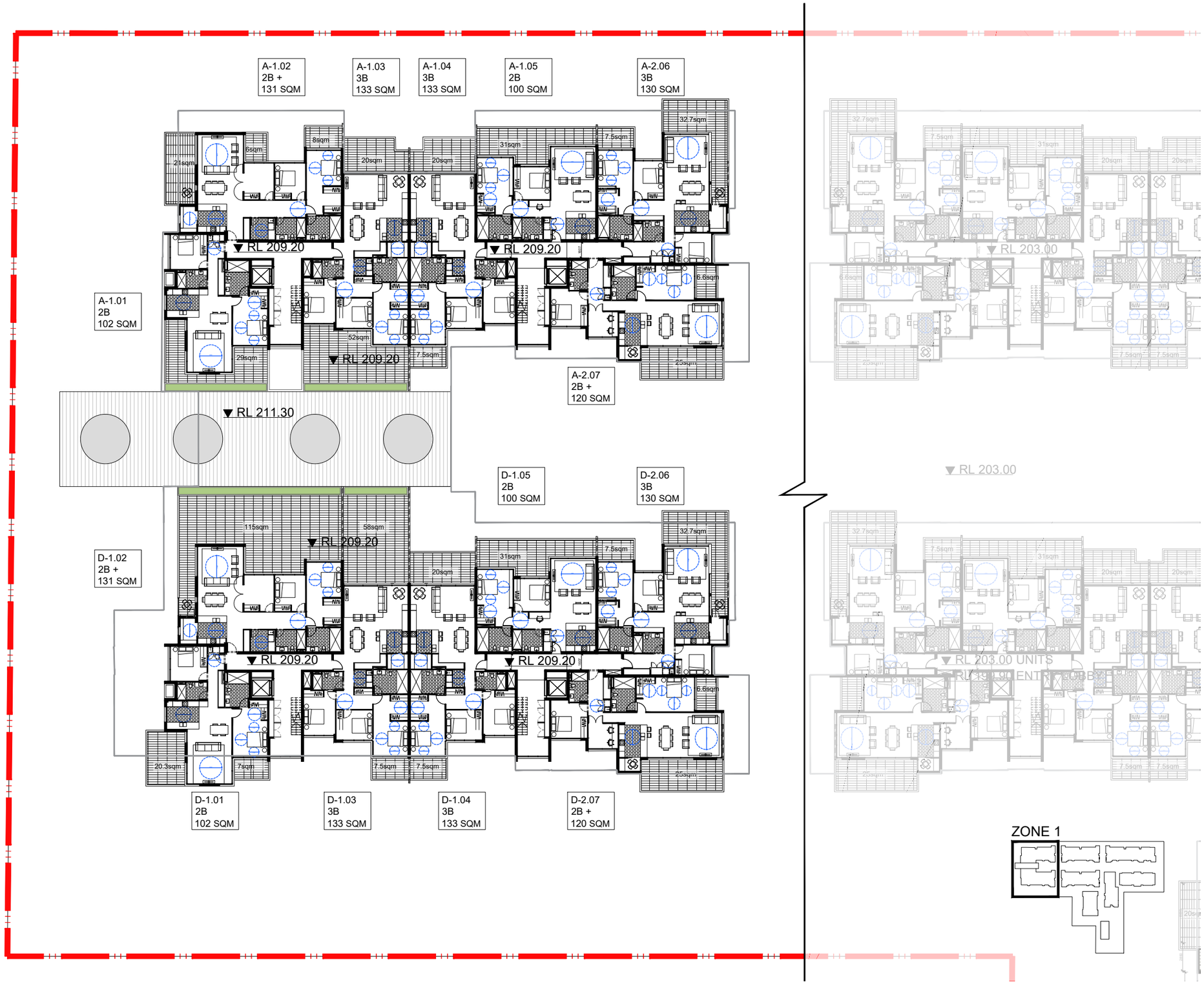

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E	2018.05.11	ISSUED FOR COORDINATION	CS
F	2018.05.23	ISSUED FOR COORDINATION	CS

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PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
PLAN SECTION - ZONE 1 RL 209.20

SCALE	DATE	DRAWN	CHECKED
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JOB	DRAWING		REVISION
16033	DA2.11		F

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C	2018.04.12	ISSUED FOR COORDINATION	CS
D	2018.04.26	ISSUED FOR COORDINATION	CS
E	2018.05.11	ISSUED FOR COORDINATION	CS
F	2018.05.23	ISSUED FOR COORDINATION	CS

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DRAWING TITLE
PLAN SECTION - ZONE 1 RL 212.30

SCALE	DATE	DRAWN	CHECKED
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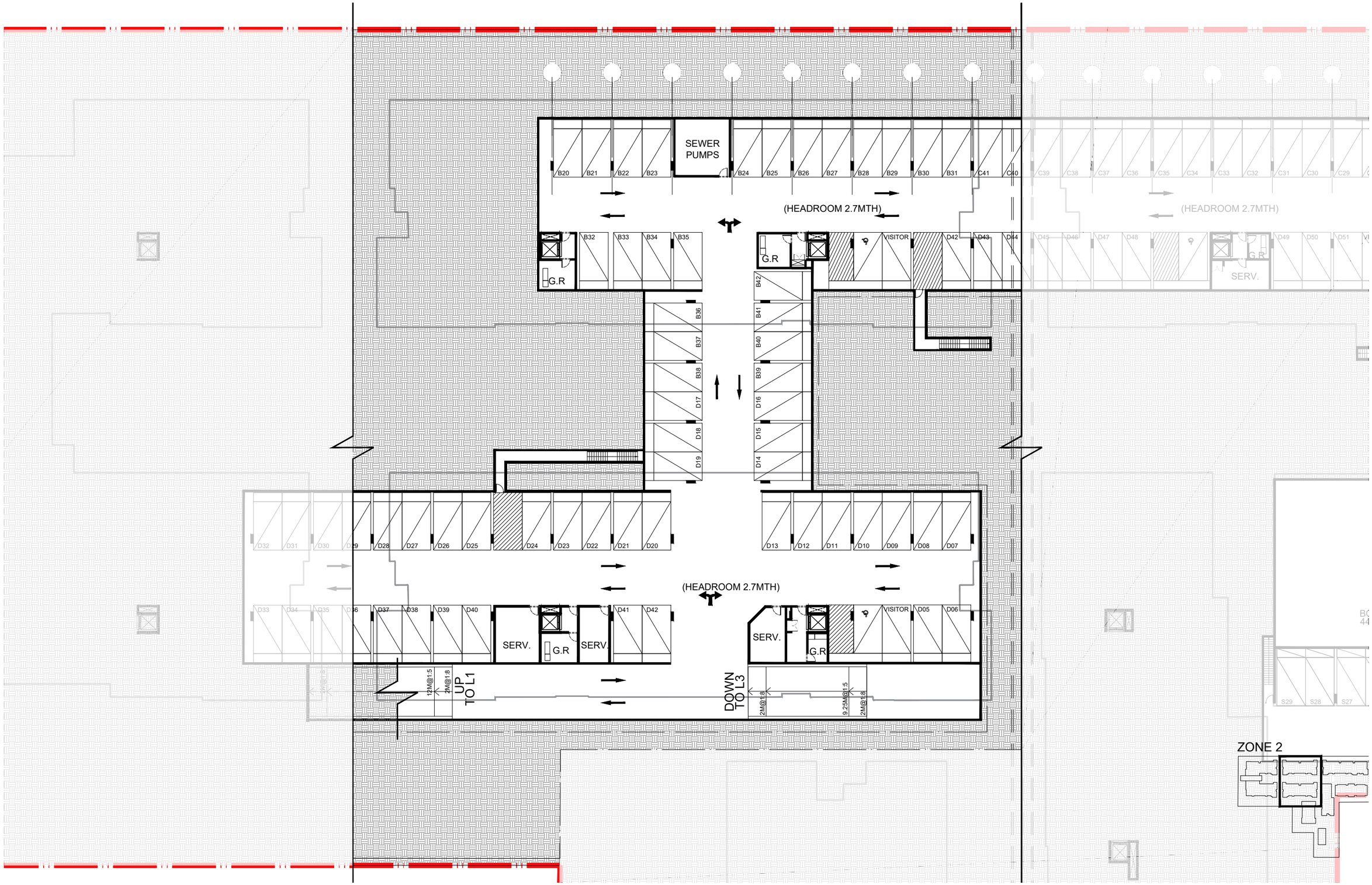

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PROJECT
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DRAWING TITLE
PLAN SECTION - ZONE 2 RL 197.

SCALE	DATE	DRAWN
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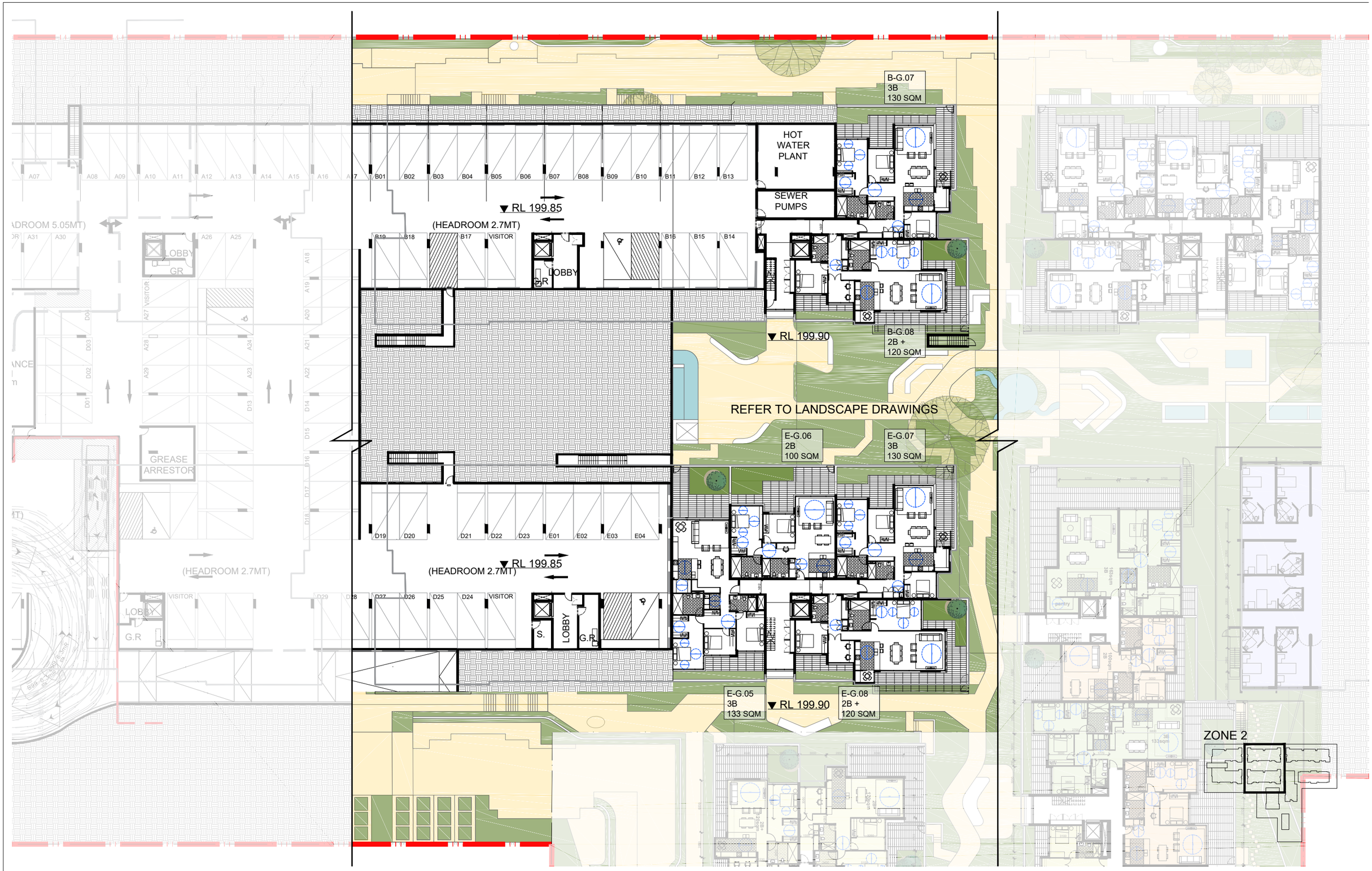
JOB	DRAWING
16033	DA2.13



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PROJECT
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DRAWING TITLE
PLAN SECTION - ZONE 2 RL 199.90

SCALE	DATE	DRAWN	CHECKED
1:200@A1 1:400@A3	29/05/2018	CS	EB

JOB	DRAWING	REVISION
16033	DA2.14	F

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PROJECT
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DRAWING TITLE
PLAN SECTION - ZONE 2 RL 203.00

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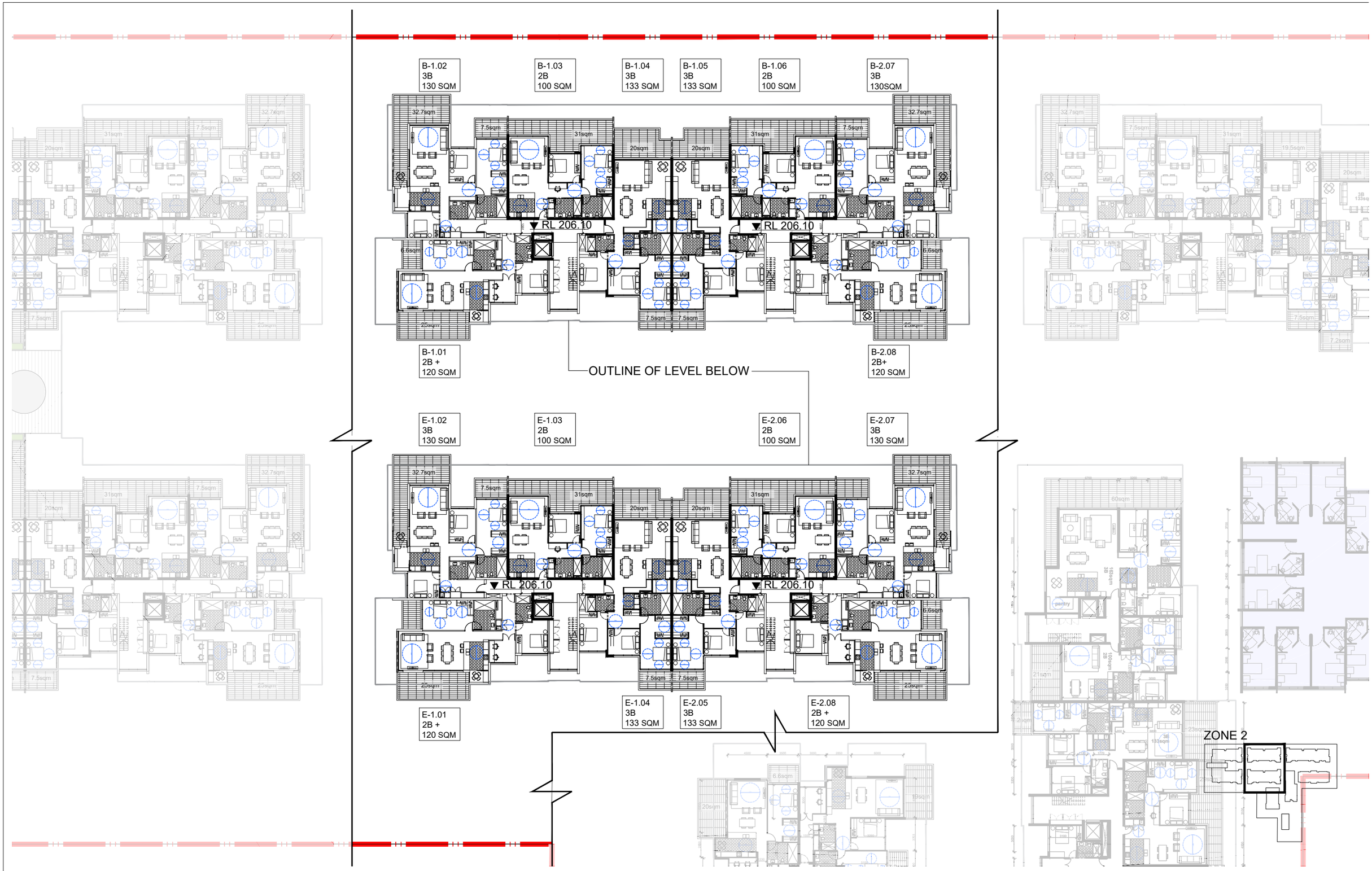

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F	2018.05.23	ISSUED FOR COORDINATION	CS

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PROJECT
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DRAWING TITLE
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SCALE	DATE	DRAWN	CHECKED
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JOB	DRAWING		REVISION
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PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
PLAN SECTION - ZONE 2 RL 209.20

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JOB	DRAWING	REVI
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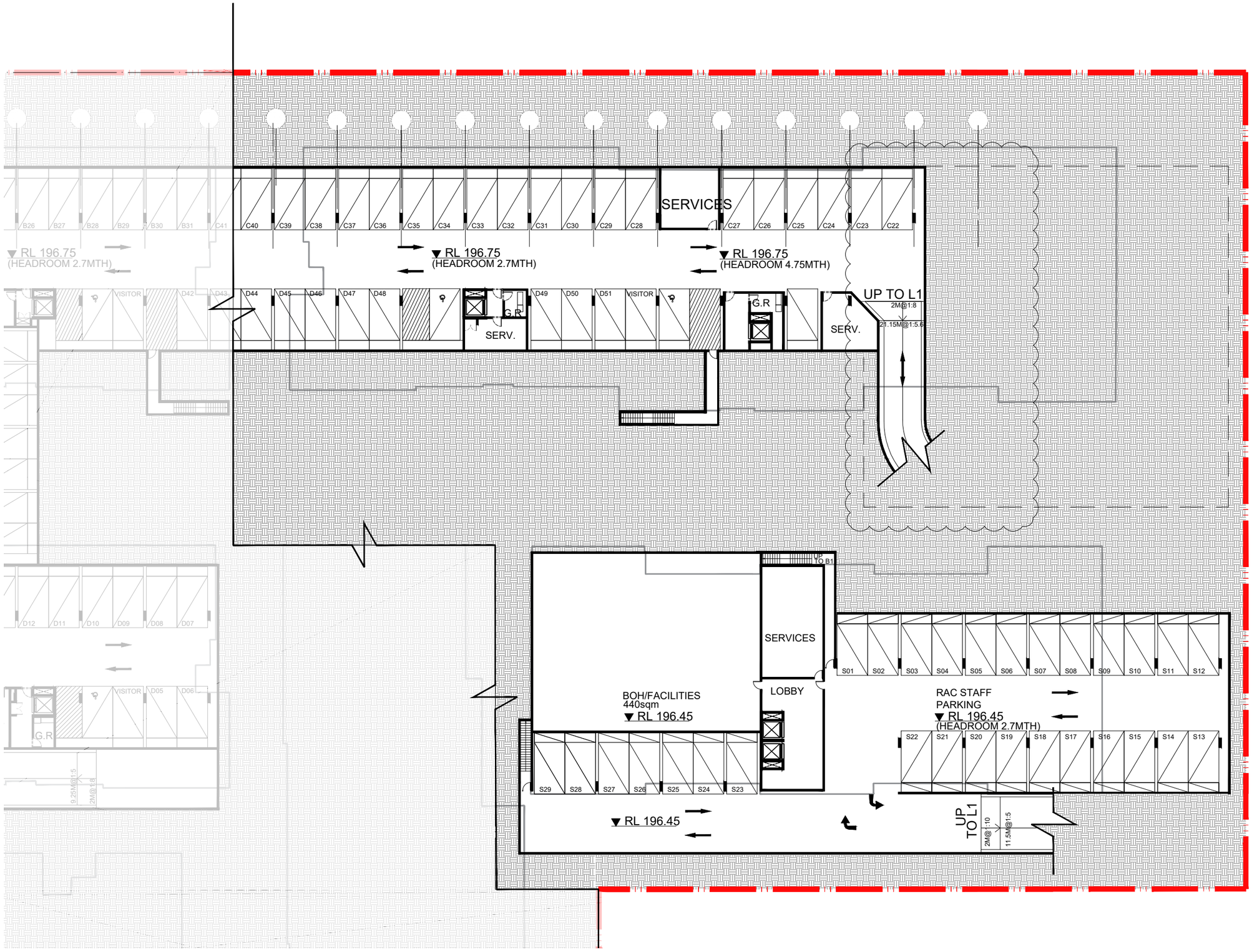
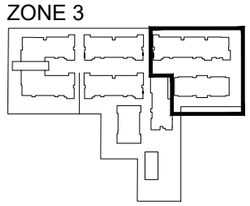


ZONE 3



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PROJECT
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DRAWING TITLE
PLAN SECTION - ZONE 3 RL 197.00

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JOB	DRAWING		REVISION
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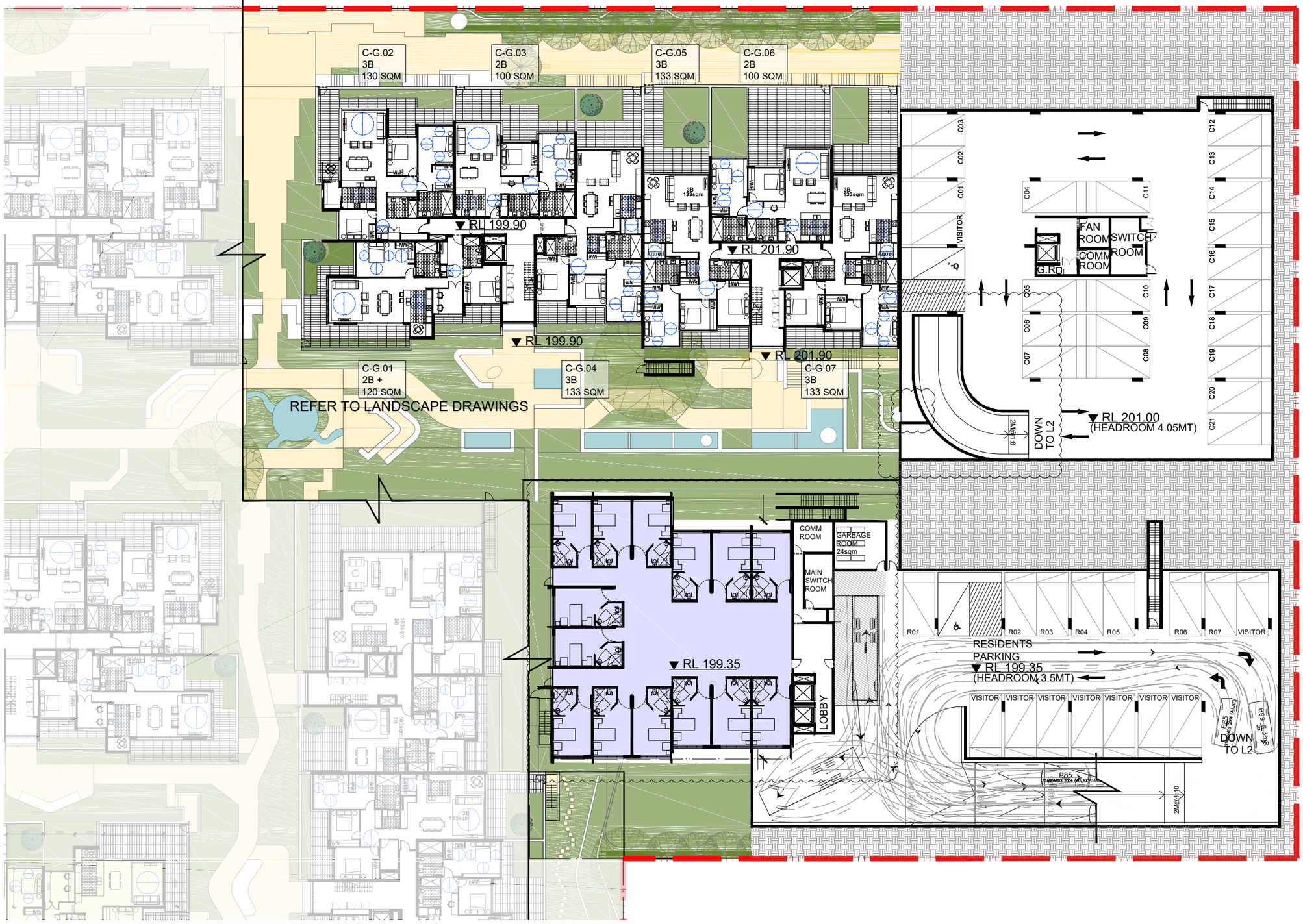
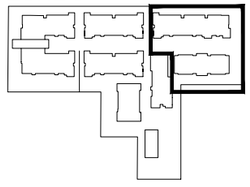


ZONE 3



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PROJECT
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DRAWING TITLE
PLAN SECTION - ZONE 3 RL 200.00

SCALE	DATE	DRAWN	CHECKED
1:200@A1 1:400@A3	29/05/2018	CS	EB
JOB	DRAWING		REVISION
16033	DA2.19		F

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DRAWING TITLE
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SCALE	DATE	DRAWN	CHECKED
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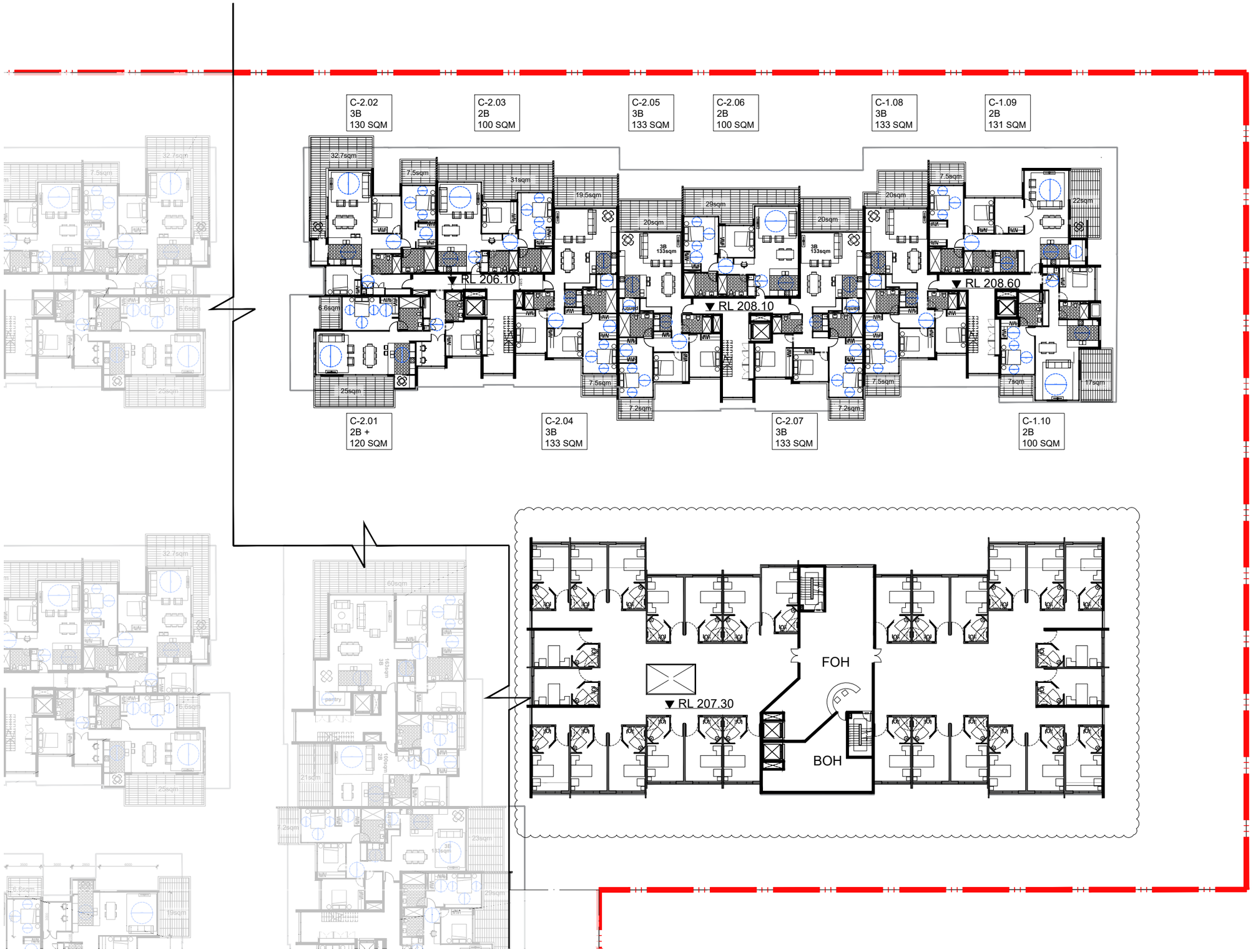

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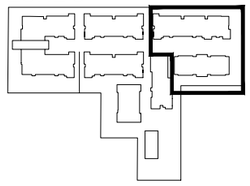

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D	2018.04.26	ISSUED FOR COORDINATION	CS
E	2018.05.11	ISSUED FOR COORDINATION	CS
F	2018.05.23	ISSUED FOR COORDINATION	CS

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PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
PLAN SECTION - ZONE 3 RL 207.00

SCALE	DATE	DRAWN	CHECKED
1:200@A1 1:400@A3	29/05/2018	CS	EB
JOB	DRAWING		REVISION
16033	DA2.21		F

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DRAWING TITLE
PLAN SECTION - ZONE 3 RL 210.00

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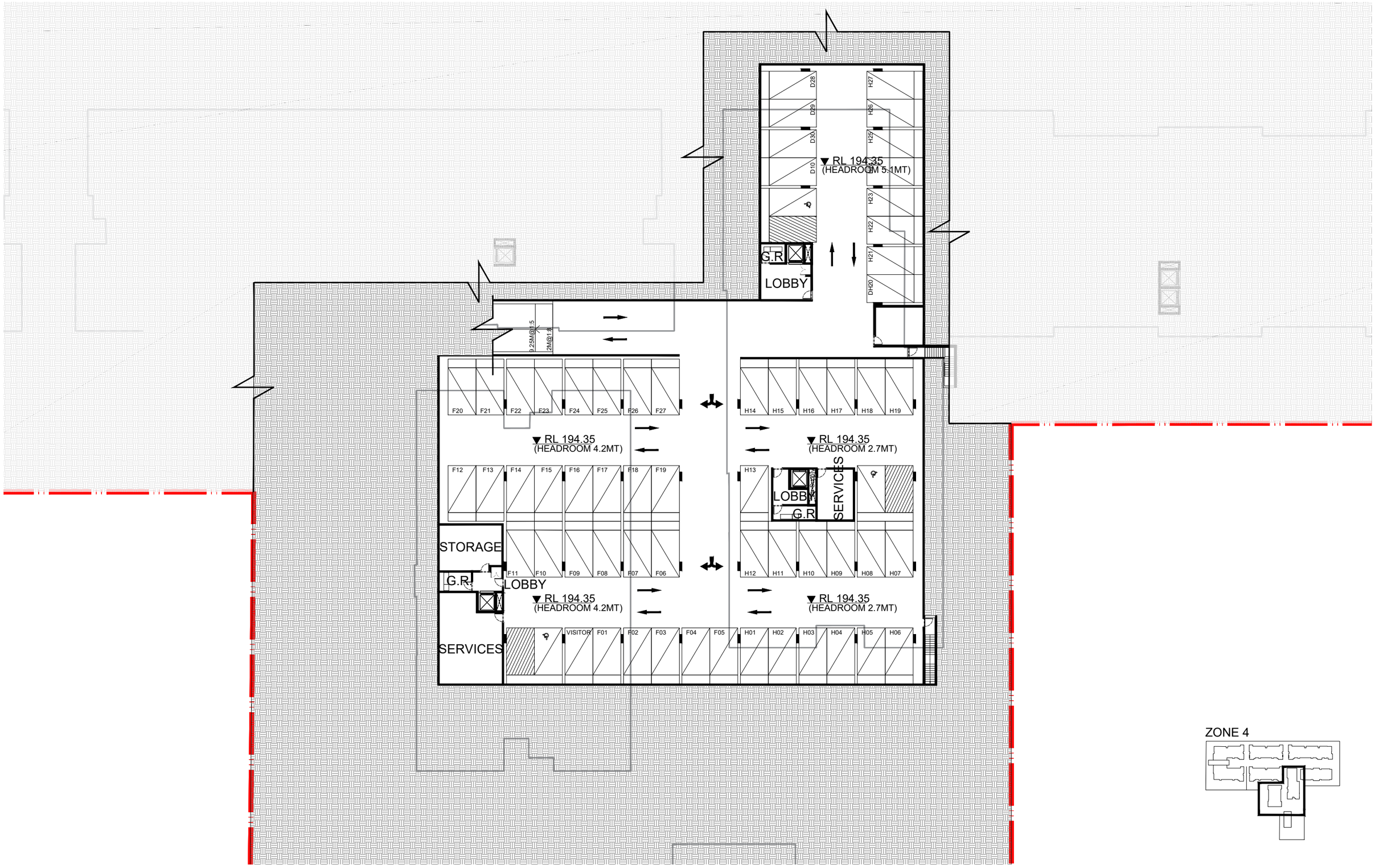

ZONE 4

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D	2018.04.26	ISSUED FOR COORDINATION	CS
E	2018.05.11	ISSUED FOR COORDINATION	CS
F	2018.05.23	ISSUED FOR COORDINATION	CS

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PROJECT
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DRAWING TITLE
PLAN SECTION - ZONE 4 RL 195.70

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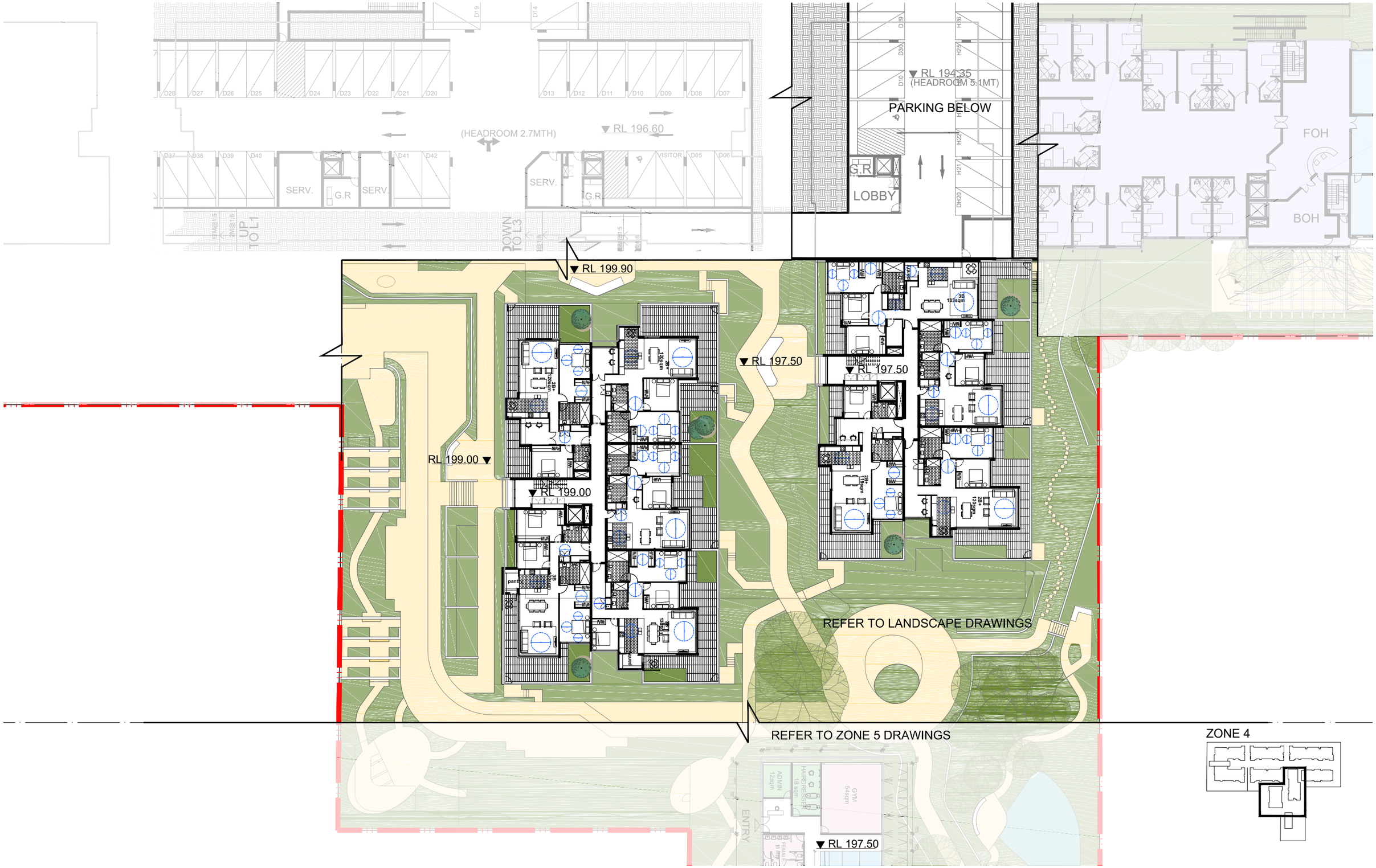

ZONE 4

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PLAN SECTION - ZONE 4 RL 199.00

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JOB	DRAWING	REVISION
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DRAWING TITLE
PLAN SECTION - ZONE 4 RL 202.10

SCALE	DATE	DRAWN	CHECKED
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JOB	DRAWING		REVISION
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PLAN SECTION - ZONE 4 RL 205.20

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JOB	DRAWING		REVISION
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PLAN SECTION - ZONE 4 RL 208.30

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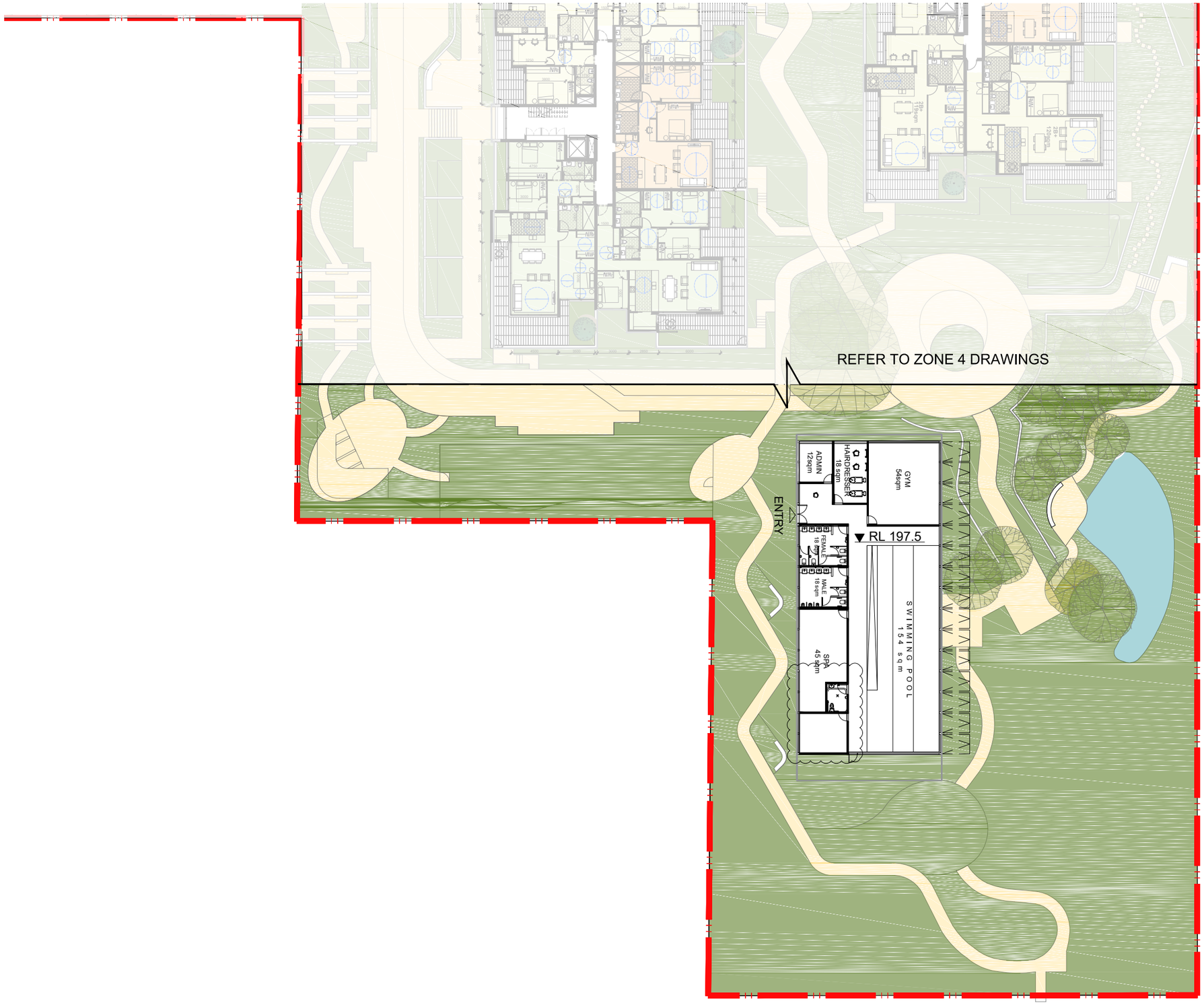

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PLAN SECTION - ZONE 5 RL 197.50

SCALE	DATE	DRAWN	CHECKED
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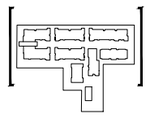
JOB	DRAWING		REVISION
16033	DA2.28		F

ELEVATION QUARRY ROAD

ELEVATION VINEYS ROAD



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ELEVATIONS QUARRY RD & VINEYS RD

SCALE	DATE	DRAWN	CHECKED
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JOB	DRAWING		REVISION
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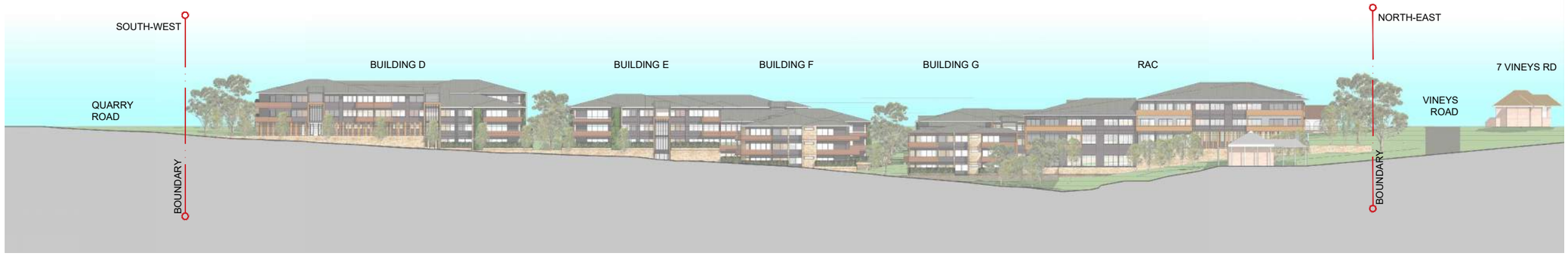
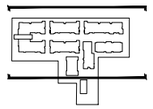
ELEVATION NORTH



ELEVATION SOUTH



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DRAWING TITLE
ELEVATIONS NORTH & SOUTH

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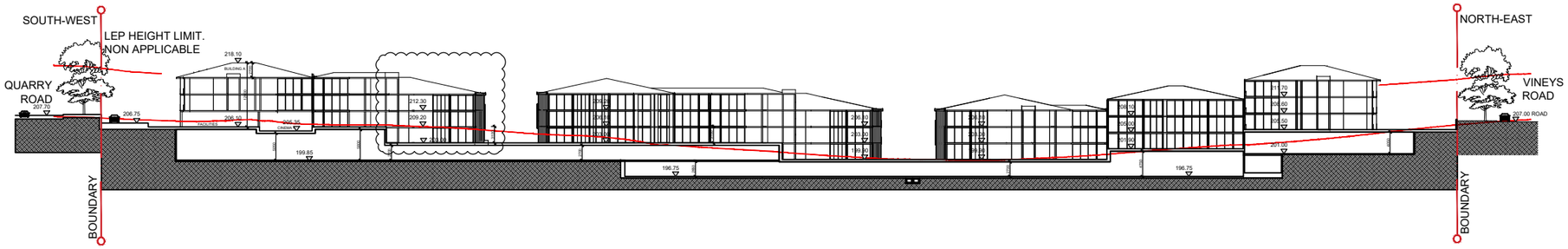

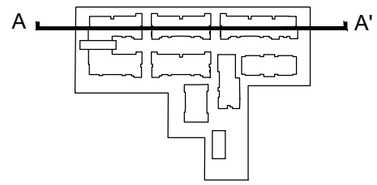

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DRAWING TITLE
SECTION AA

SCALE	DATE	DRAWN	CHECKED
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JOB	DRAWING	REVISION
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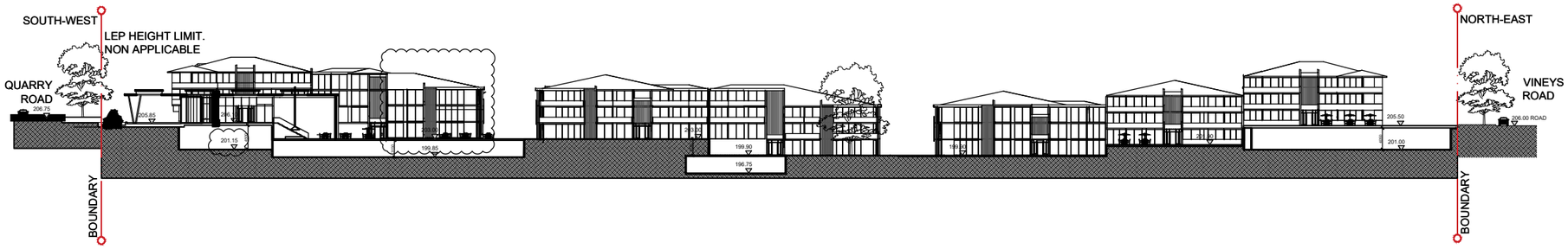

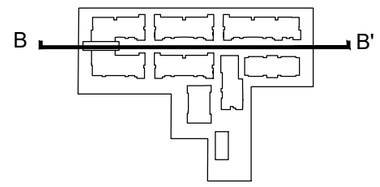

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SECTION BB

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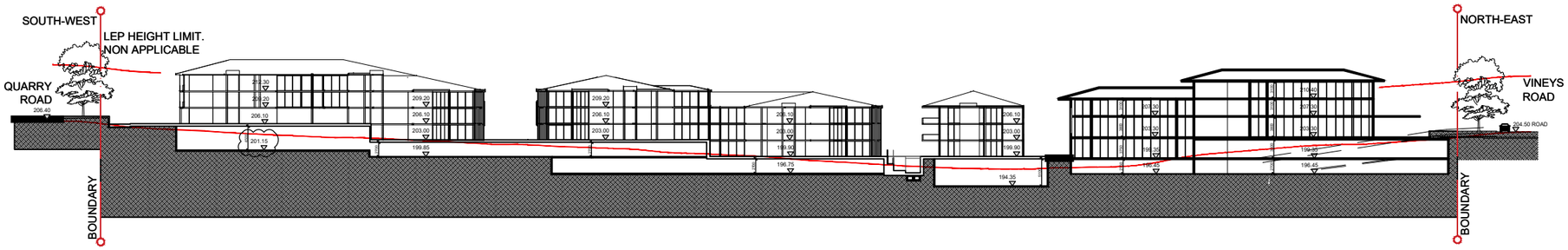

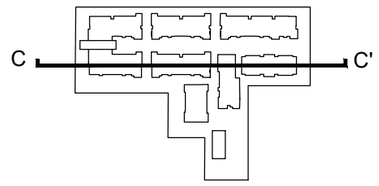

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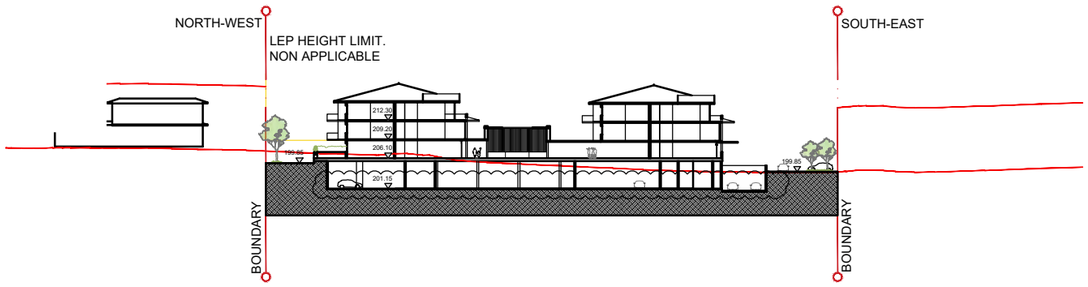
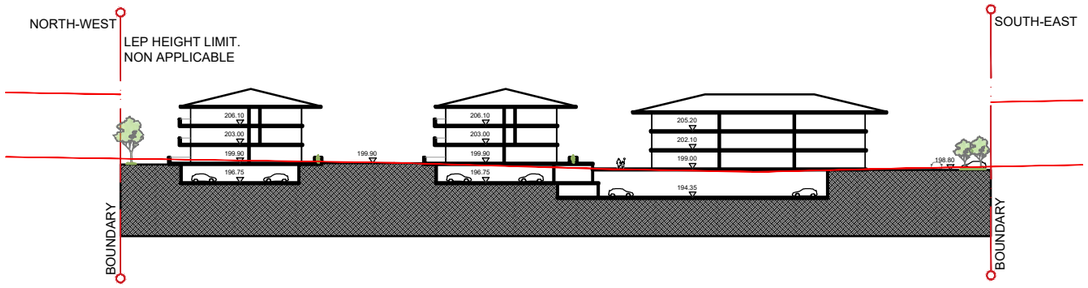


SECTION 1-1



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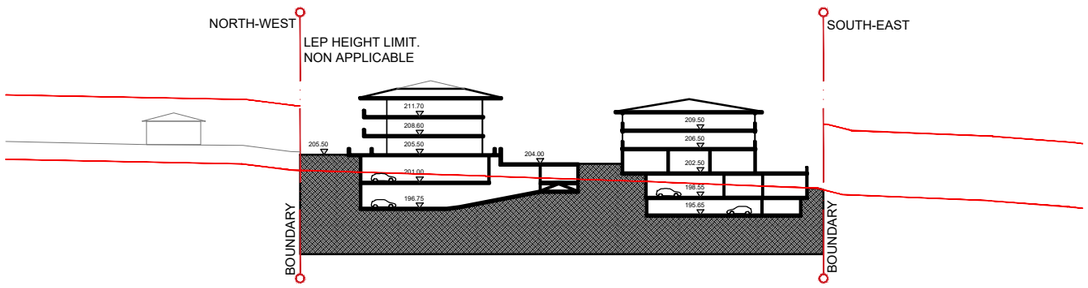

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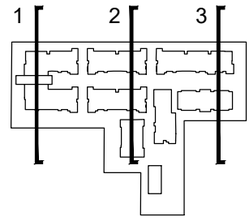

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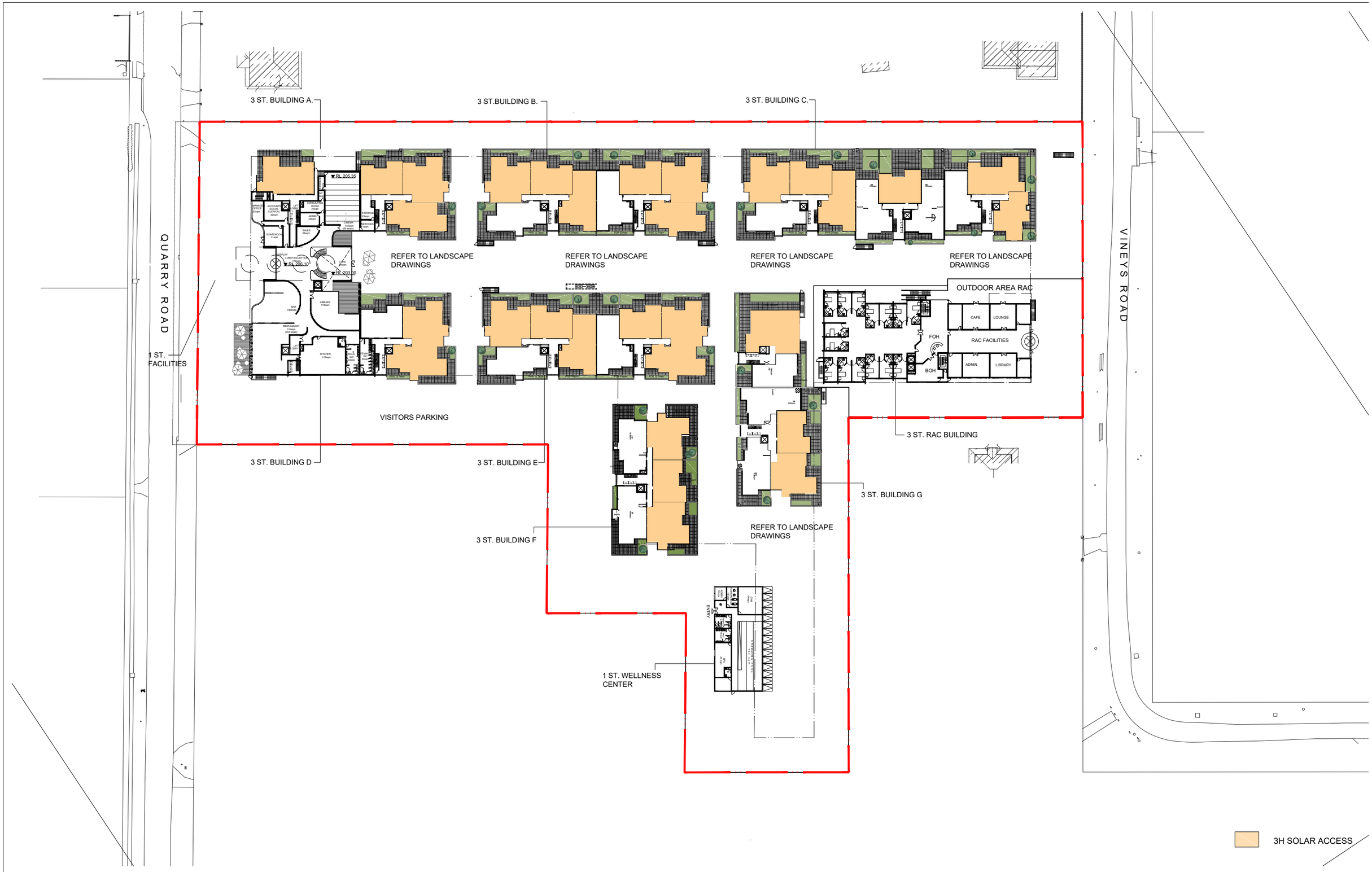
DRAWING TITLE
SECTIONS 1, 2, 3

PROJECT
3 Quarry Rd, Dural

SCALE	DATE	DRAWN	CHECKED
1:500@A1 1:1000@A3	29/05/2018	CS	EB

JOB	DRAWING	REVISION
16033	DA4.05	F



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PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
SOLAR ACCESS - GROUND FLOOR

SCALE	DATE	DRAWN	CHECKED
1:500@A1 1:1000@A3	29/05/2018	CS	EB

JOB	DRAWING	REVISION
16033	DA5.01	F

3H SOLAR ACCESS

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PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
SOLAR ACCESS - LEVEL 1

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JOB	DRAWING	REVISION
16033	DA5.02	F

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DRAWING TITLE
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JOB	DRAWING	REVISION
16033	DA5.03	F

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F	2018.05.23	ISSUED FOR COORDINATION	CS

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PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
CROSS VENTILATION GF

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JOB	DRAWING		REVISION
16033	DA5.04		F

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CROSS VENTILATION L1

PROJECT
3 Quarry Rd, Dural

SCALE	DATE	DRAWN	CHECKED
1:500@A1 1:1000@A3	29/05/2018	CS	EB

JOB	DRAWING	REVISION
16033	DA5.05	F

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DRAWING TITLE
CROSS VENTILATION L2

SCALE	DATE	DRAWN	CHECKED
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JOB	DRAWING	REVISION
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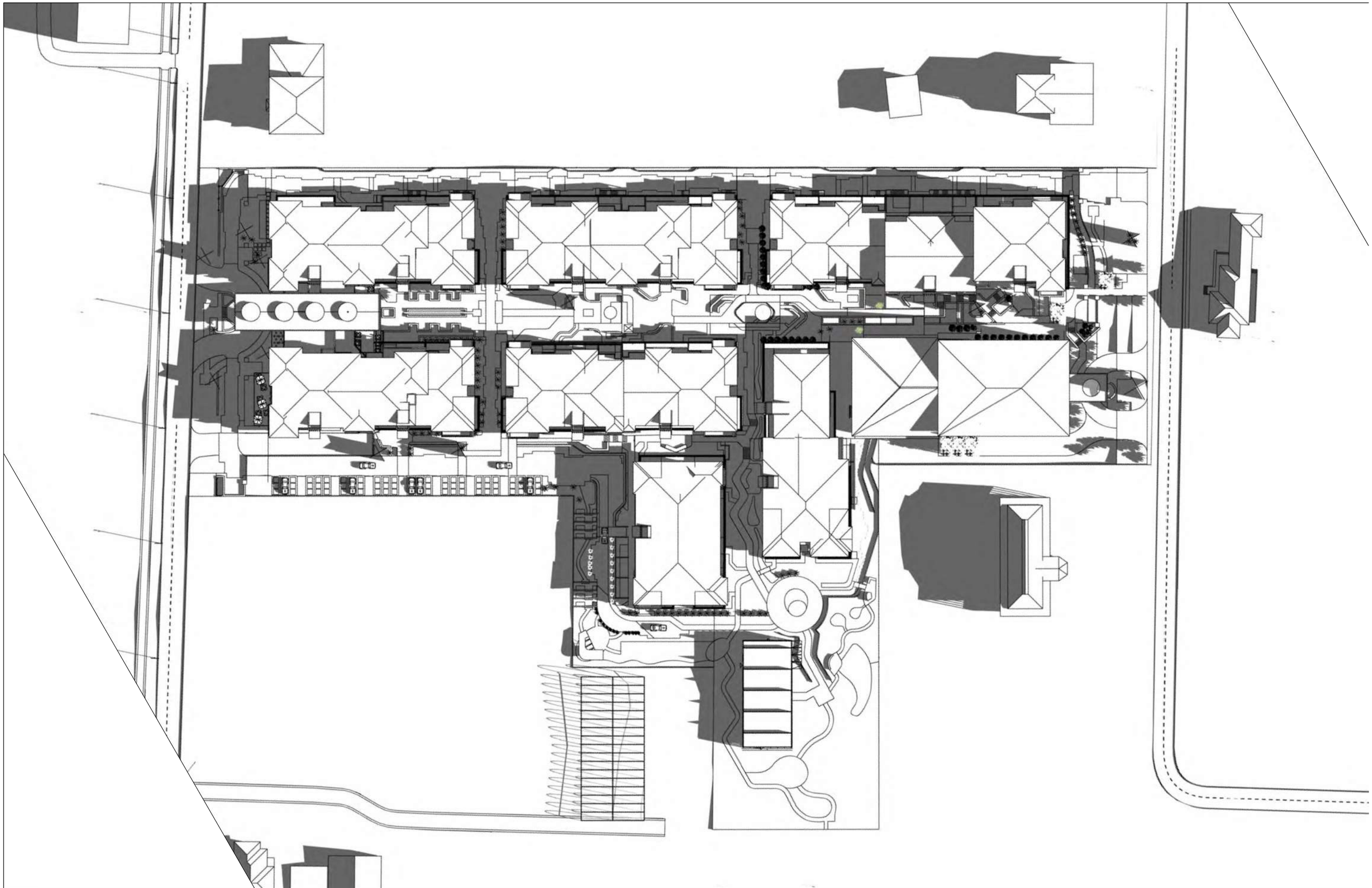

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PROJECT
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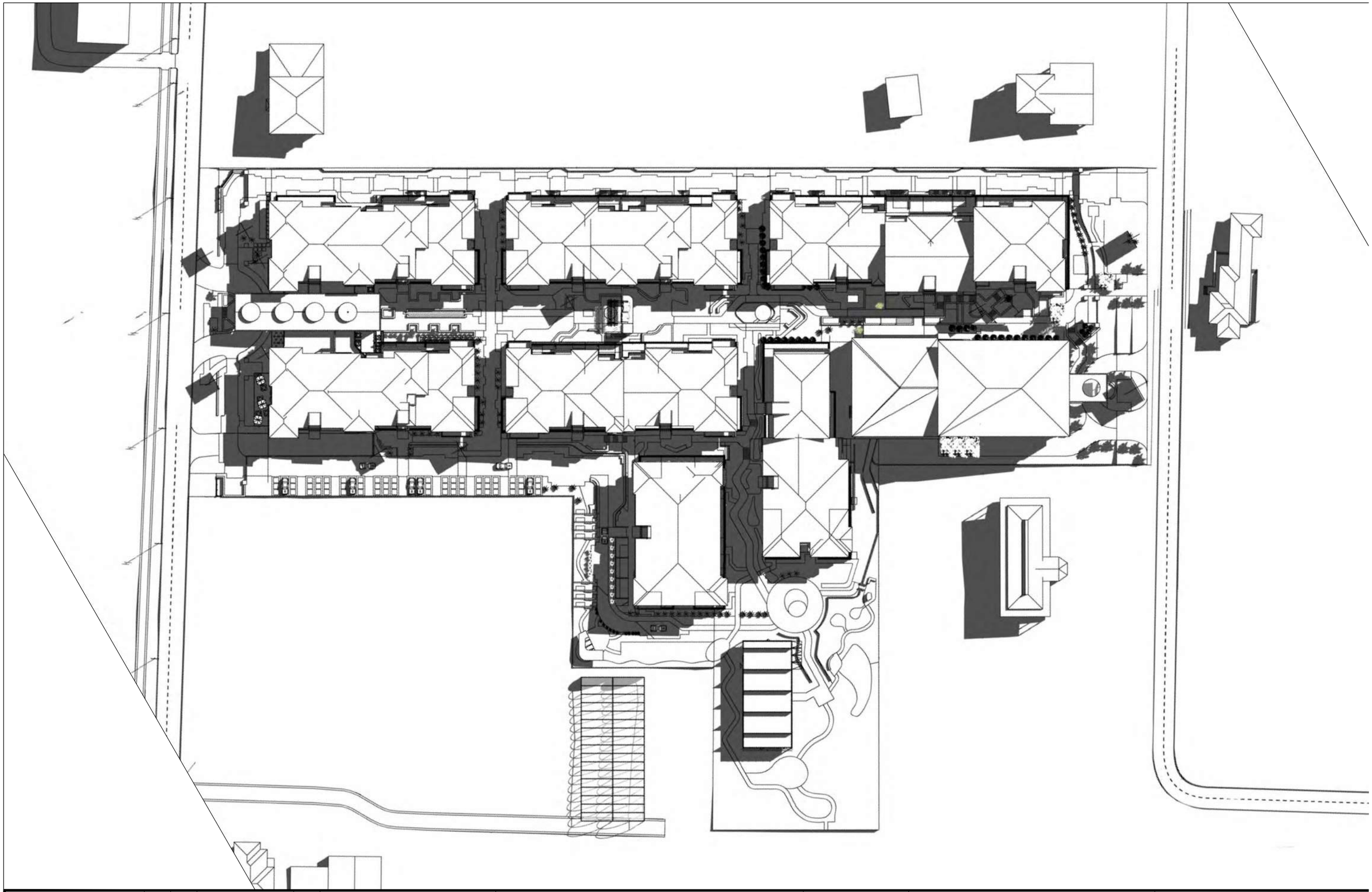
SHADOW DIAGRAM 9 AM

SCALE	DATE	DRAWN	CHE
NTS ----	29/05/2018	CS	EB

JOB	DRAWING	REVI
16033	DA5.07	F



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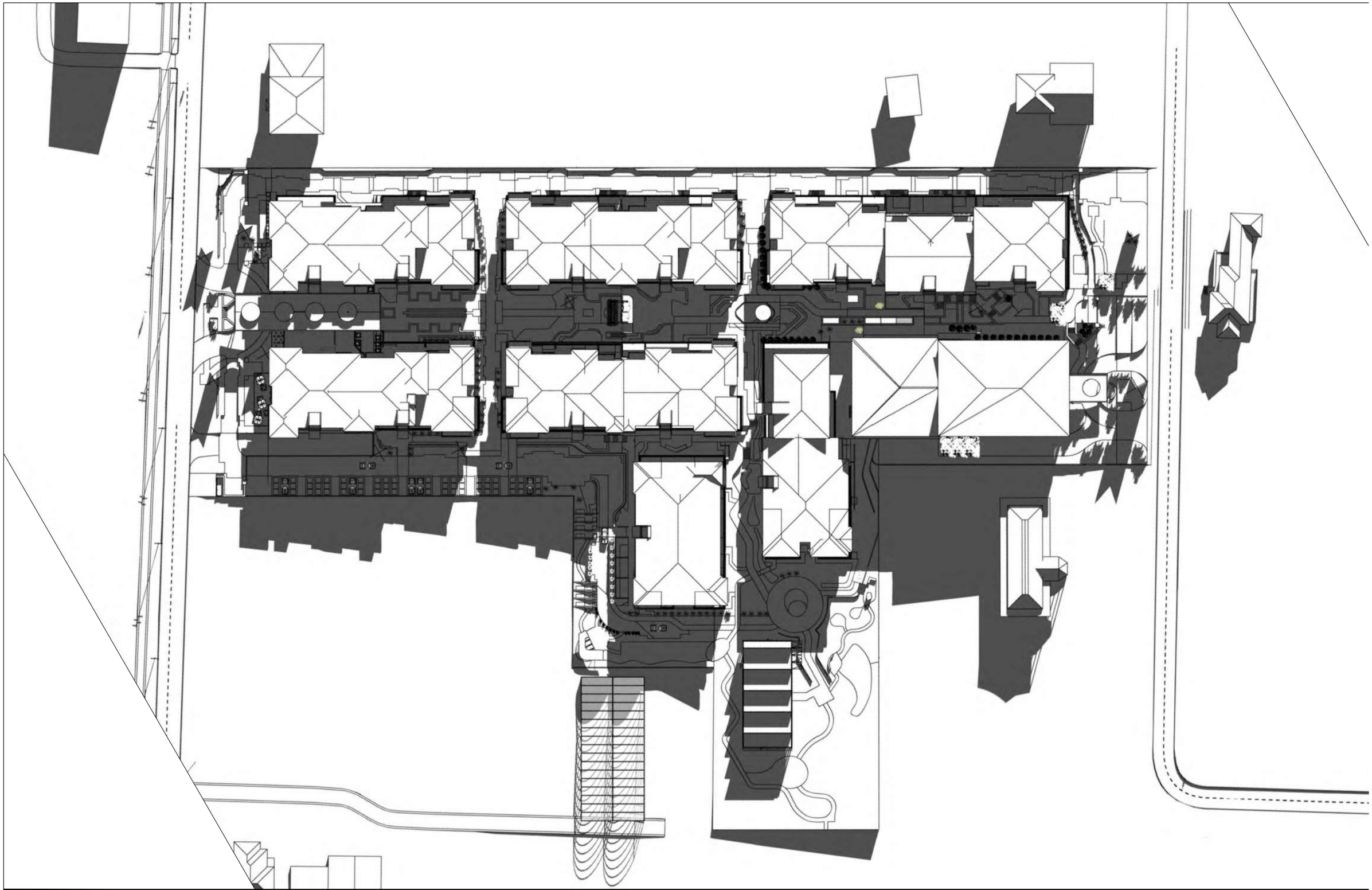
DRAWING TITLE
SHADOW DIAGRAM 12 PM

SCALE	DATE	DRAWN	CHE
NTS ----	29/05/2018	CS	EB

JOB	DRAWING	REVI
16033	DA5.08	F



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SHADOW DIAGRAM 15 PM

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16033	DA5.09	F

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PROJECT
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DRAWING TITLE
PERSPECTIVE VIEW FROM QUARRY RI

SCALE	DATE	DRAWN	CHECKED
NTS ----	29/05/2018	BM	EB
JOB	DRAWING		REVISION
16033	DA7.01		F

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PROJECT
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DRAWING TITLE
PERSPECTIVE VIEW FROM VINEYS RD

SCALE	DATE	DRAWN	CHECKED
NTS ----	29/05/2018	BM	EB
JOB 16033	DRAWING DA7.02		REVISION F

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PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
PERSPECTIVE VIEW NORTH ELEVATION

SCALE	DATE	DRAWN	CHECKED
NTS ----	29/05/2026	CS	EB

JOB	DRAWING	REVISION
16033	DA7.03	F

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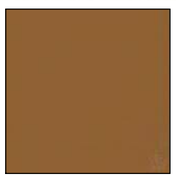
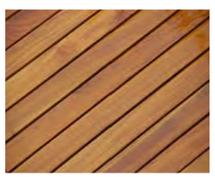


2. DEEP SIENNA RENDER
(DULUX 37127)

3. DARK GREY RENDER
(DULUX WAYWARD GR7)



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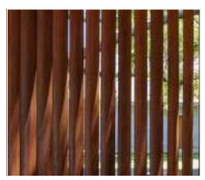

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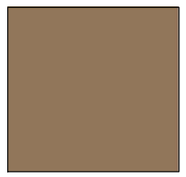
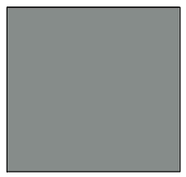
"TIMBER" LOUVERS



2. BROWNSTONE RENDER
(DULUX 37508)



3. LIGHT GREY RENDER
(DULUX TIMELESS GR23)

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D	2018.04.26	ISSUED FOR COORDINATION	CS
E	2018.05.11	ISSUED FOR COORDINATION	CS
F	2018.05.23	ISSUED FOR COORDINATION	CS

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P +61 2 9922 4375 **F** +61 2 9929 5786 **E** info@marchesepartners.com
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CLIENT
SUNGLOW AUSTRALIA

PROJECT
3 Quarry Rd, Dural

DRAWING TITLE
EXTERIOR FINISHES

SCALE	DATE	DRAWN	CHECKED
NTS ----	29/05/2018	BM	EB
JOB	DRAWING		REVISION
16033	7.05		F

Appendix B

AHIMS Report

Office of Environment & Heritage

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Dural

Client Service ID : 333213

Duncan Scott-Lawson

Date: 13 March 2018

Attention: Duncan Scott-Lawson

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -33.6956, 151.033 - Lat, Long To : -33.693, 151.0371 with a Buffer of 50 meters, conducted by Duncan Scott-Lawson on 13 March 2018.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

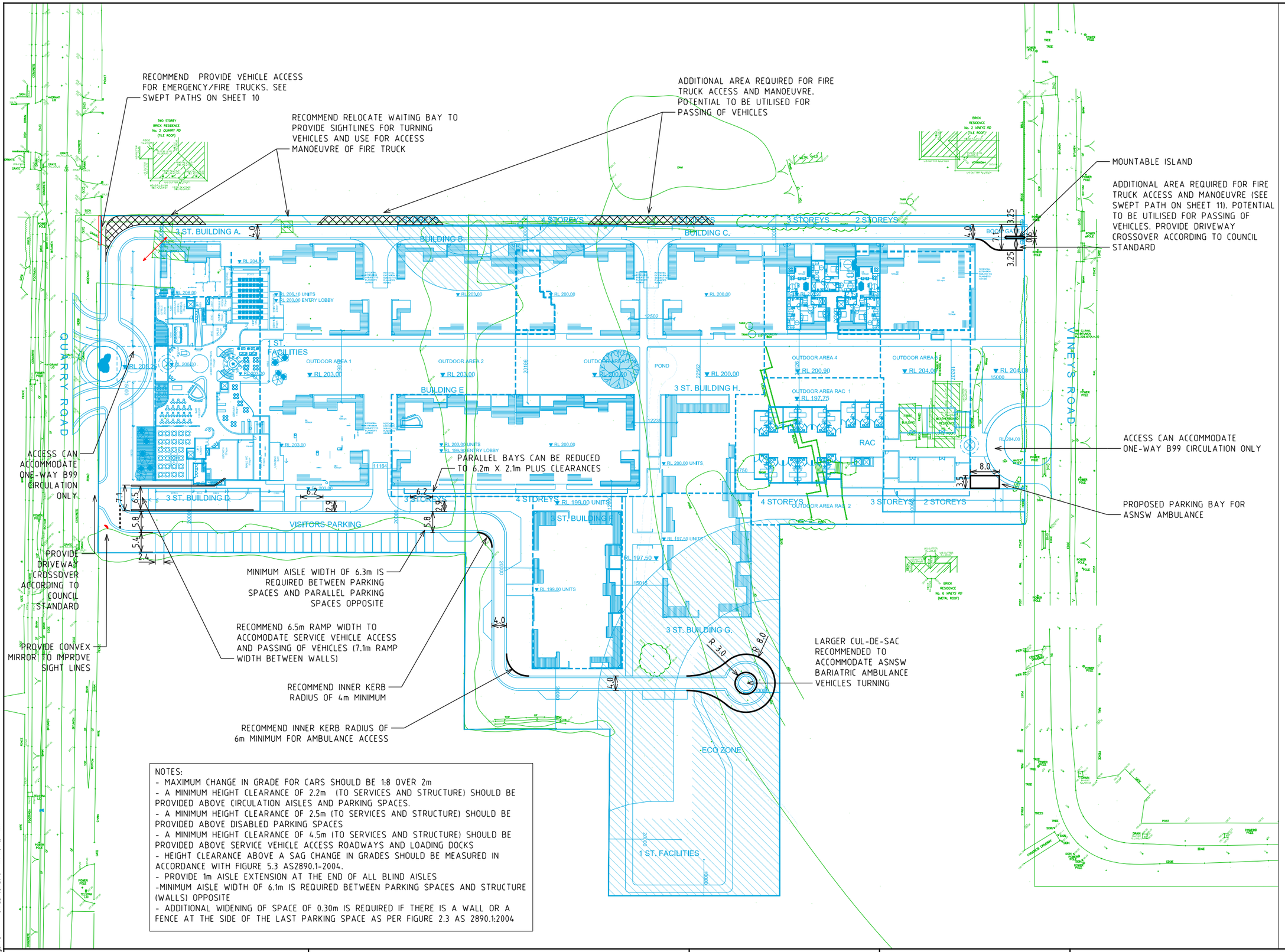
- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Appendix C

Traffic Plan (GTA Consultancy)



NOTES:
- MAXIMUM CHANGE IN GRADE FOR CARS SHOULD BE 1:8 OVER 2m
- A MINIMUM HEIGHT CLEARANCE OF 2.2m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE CIRCULATION AISLES AND PARKING SPACES.
- A MINIMUM HEIGHT CLEARANCE OF 2.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE DISABLED PARKING SPACES
- A MINIMUM HEIGHT CLEARANCE OF 4.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE SERVICE VEHICLE ACCESS ROADWAYS AND LOADING DOCKS
- HEIGHT CLEARANCE ABOVE A SAG CHANGE IN GRADES SHOULD BE MEASURED IN ACCORDANCE WITH FIGURE 5.3 AS2890.1-2004.
- PROVIDE 1m AISLE EXTENSION AT THE END OF ALL BLIND AISLES
-MINIMUM AISLE WIDTH OF 6.1m IS REQUIRED BETWEEN PARKING SPACES AND STRUCTURE (WALLS) OPPOSITE
- ADDITIONAL WIDENING OF SPACE OF 0.30m IS REQUIRED IF THERE IS A WALL OR A FENCE AT THE SIDE OF THE LAST PARKING SPACE AS PER FIGURE 2.3 AS 2890.1:2004

PLOTTED BY : Clifford.Aguirre ON 22/03/2018 AT 11:47:54 AM

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Gold Coast	07 5510 4814
Townsville	07 4722 2765
Perth	08 6169 1000

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

DESIGNED C.AGUIRRE	DESIGN CHECK H.OBERMAIER
APPROVED BY -	DATE ISSUED 22 MARCH 2018

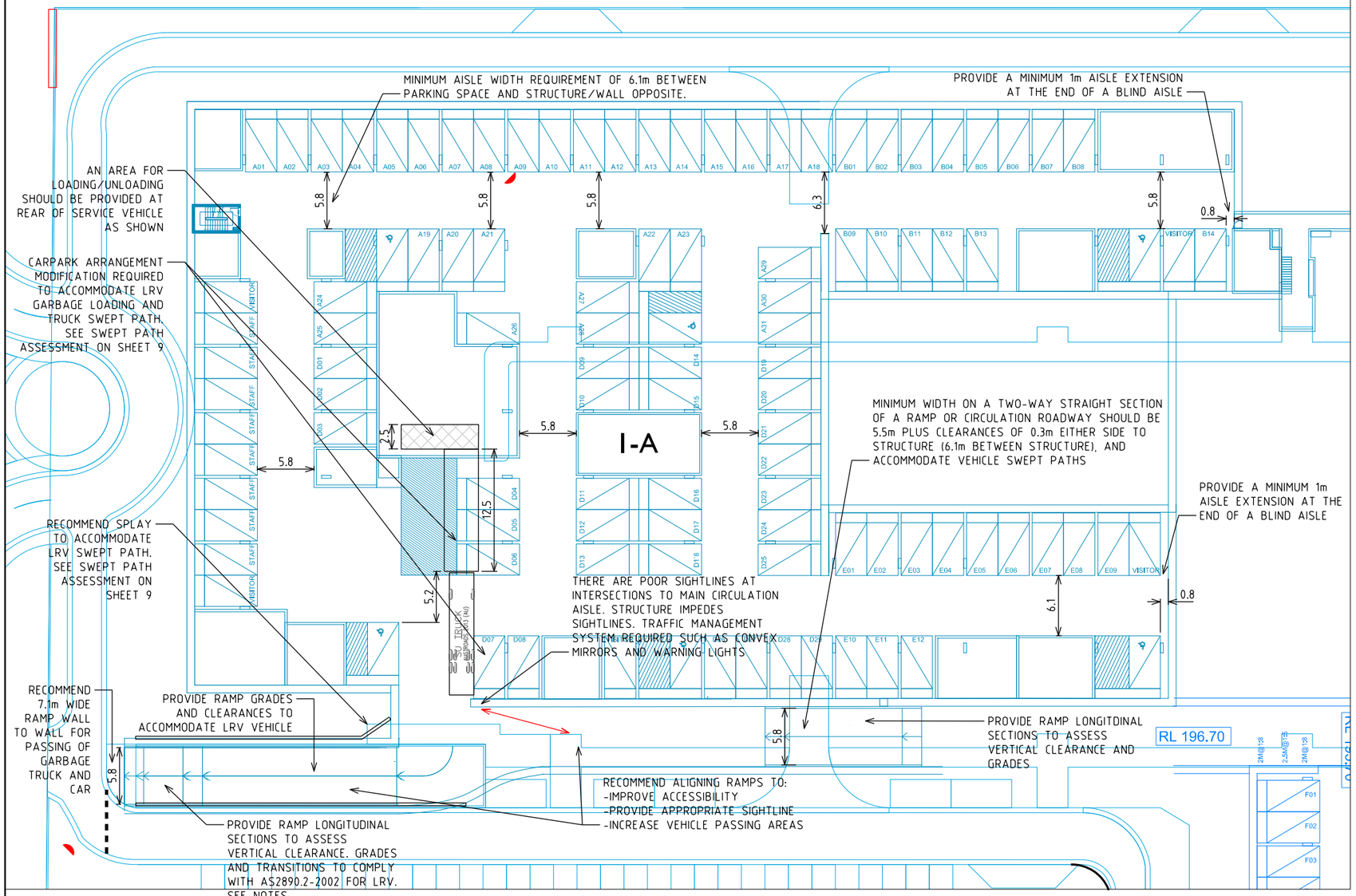
SCALE A3 — 0 10 20 — 1:1000

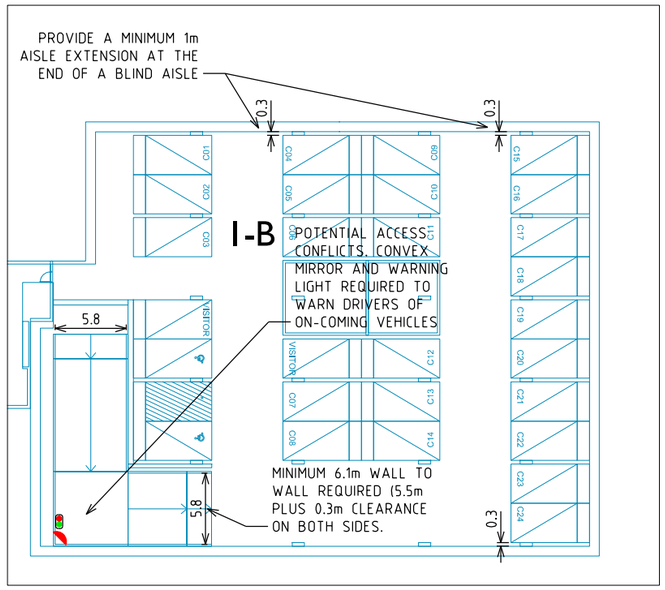
CAD FILE NO. N142020-01-P2.dgn

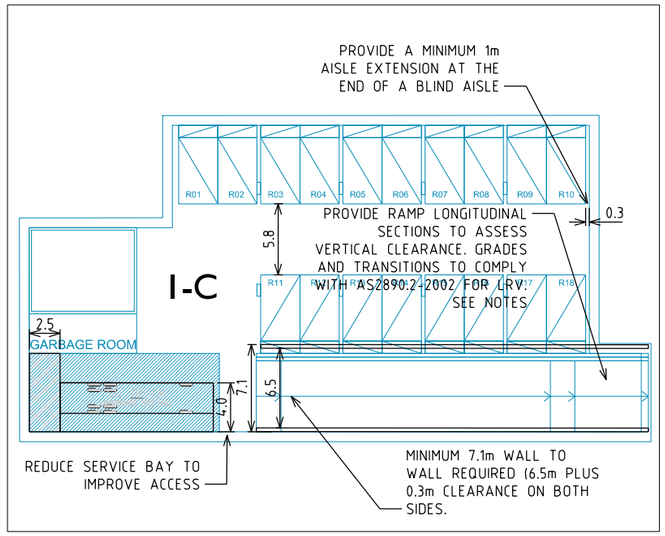
3 QUARRY ROAD, DURAL

GROUND LEVEL
CARPARK COMPLIANCE REVIEW

DRAWING NO. N142020-01-01 SHEET 01 OF 11 ISSUE P1

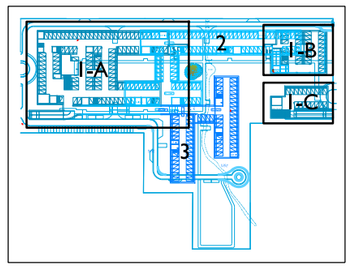






NOTES FOR LOADING SERVICE VEHICLE ACCESS:
- HEIGHT CLEARANCES FOR SERVICE VEHICLES OVER 6.4M IN LENGTH SHOULD BE MINIMUM 4.5M. HEIGHT CLEARANCE FOR VEHICLES UPTO 6.4M SRV SHOULD BE A MINIMUM 3.5M.
- HEIGHT CLEARANCES MAYBE REDUCED SUBJECT TO COUNCIL APPROVAL AND DESIGNED FOR THE LARGEST DESIGN VEHICLE.
HEIGHT CLEARANCE TO BE MEASURED TO STRUCTURE AND SERVICES.
- THE MAXIMUM GRADE FOR A VEHICLE EXIT SHOULD BE 1:20 (5%) FOR 6.0M PRIOR TO THE PROPERTY LINE, BUILDING LINE AND/OR PEDESTRIAN WALKWAYS. THE LENGTH OF THIS GRADE SHOULD BE INCREASED TO 7.0M FOR LRV, AND 10.0M FOR ARTICULATED VEHICLES TO ACCOMMODATE CHANGE IN GRADE REQUIREMENTS.
MAXIMUM CHANGE IN GRADE (DIFFERENCE BETWEEN TWO ADJACENT RAMP GRADES) SHOULD BE:
SRV 1:12 (8.3%) OVER 4.0M (EG 1:20 TO A MAXIMUM GRADE OF 1:7.5)
MRV & LRV 1:16 (6.25%) OVER 7.0M (EG. 1:16 TO A MAXIMUM GRADE OF 1:8)
ARTICULATED 1:16 (6.25%) OVER 10.0M (EG 1:20 TO A MAXIMUM GRADE OF 1:8.9)
- MAXIMUM GRADE FOR SERVICE VEHICLE RAMPS SHOULD BE 1:6.5 (15.4%)
- MAXIMUM CROSS FALL ON A RAMP SHOULD BE 1;20 (5%)
- MAXIMUM GRADE OF A SERVICE BAY SHOULD BE 1:25 AND SUBJECT TO CLIENTS MAXIMUM SPECIFICATIONS.

NOTES FOR OFF-STREET CAR PARKING:
- MAXIMUM CHANGE IN GRADE FOR CARS SHOULD BE 1:8 OVER 2m
- A MINIMUM HEIGHT CLEARANCE OF 2.2m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE CIRCULATION AISLES AND PARKING SPACES.
- A MINIMUM HEIGHT CLEARANCE OF 2.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE DISABLED PARKING SPACES
- A MINIMUM HEIGHT CLEARANCE OF 4.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE SERVICE VEHICLE ACCESS ROADWAYS AND LOADING DOCKS
- HEIGHT CLEARANCE ABOVE A SAG CHANGE IN GRADES SHOULD BE MEASURED IN ACCORDANCE WITH FIGURE 5.3 AS2890.1-2004.
- PROVIDE 1m AISLE EXTENSION AT THE END OF ALL BLIND AISLES
-MINIMUM AISLE WIDTH OF 6.1m IS REQUIRED BETWEEN PARKING SPACES AND STRUCTURE (WALLS) OPPOSITE
- MINIMUM WIDTH ON A TWO-WAY STRAIGHT SECTION OF A RAMP OR CIRCULATION ROADWAY SHOULD BE 5.5m PLUS CLEARANCES OF 0.3m EITHER SIDE TO STRUCTURE (6.1m BETWEEN STRUCTURE), AND ACCOMMODATE VEHICLE SWEPT PATHS



BASEMENT 1 LOCATIONS KEY

GTA consultants
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Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Canberra 02 6243 9400
Adelaide 08 8334 3600
Gold Coast 07 5510 4814
Townsville 07 4722 2765
Perth 08 6169 1000

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

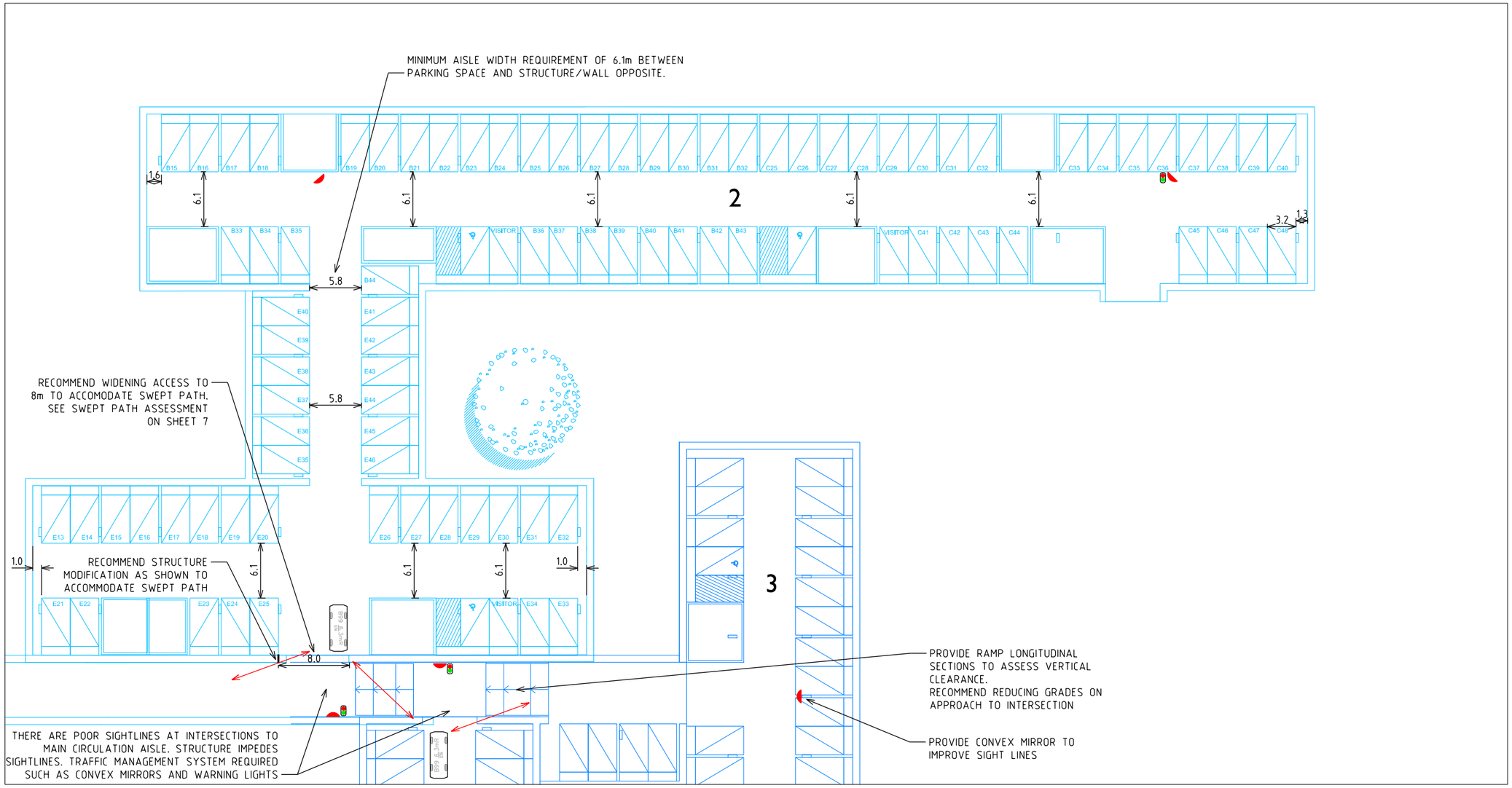
DESIGNED	DESIGN CHECK	SCALE	
C.AGUIRRE	H.OBERMAIER	A3	1:500
APPROVED BY	DATE ISSUED	CAD FILE NO.	
-	22 MARCH 2018	N142020-01-P2.dgn	

3 QUARRY ROAD, DURAL

BASEMENT 1
CARPARK COMPLIANCE REVIEW

DRAWING NO. N142020-01-02 SHEET 02 OF 11 ISSUE P1

PLOTTED BY : Clifford.Aguirre ON 22/03/2018 AT 11:47:58 AM



NOTES:
- MAXIMUM CHANGE IN GRADE FOR CARS SHOULD BE 1:8 OVER 2m
- A MINIMUM HEIGHT CLEARANCE OF 2.2m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE CIRCULATION AISLES AND PARKING SPACES.
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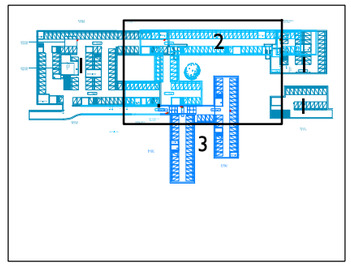

BASEMENT 2 LOCATION KEY

PLOTTED BY : Clifford.Aguirre ON 22/03/2018 AT 11:47:59 AM

GTA consultants
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Melbourne	03 9851 9600
Sydney	02 8448 1800
Brisbane	07 3113 5000
Canberra	02 6243 9400
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Gold Coast	07 5510 4814
Townsville	07 4722 2765
Perth	08 6169 1000

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

DESIGNED C.AGUIRRE
DESIGN CHECK H.OBERMAIER
APPROVED BY -
DATE ISSUED 22 MARCH 2018
SCALE A3 0 5 10 1:500
CAD FILE NO. N142020-01-P2.dgn

3 QUARRY ROAD, DURAL

BASEMENT 2
CARPARK COMPLIANCE REVIEW

DRAWING NO. N142020-01-03 SHEET 03 OF 11 ISSUE P1

NOTES:
- MAXIMUM CHANGE IN GRADE FOR CARS SHOULD BE 1:8 OVER 2m
- A MINIMUM HEIGHT CLEARANCE OF 2.2m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE CIRCULATION AISLES AND PARKING SPACES.
- A MINIMUM HEIGHT CLEARANCE OF 2.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE DISABLED PARKING SPACES
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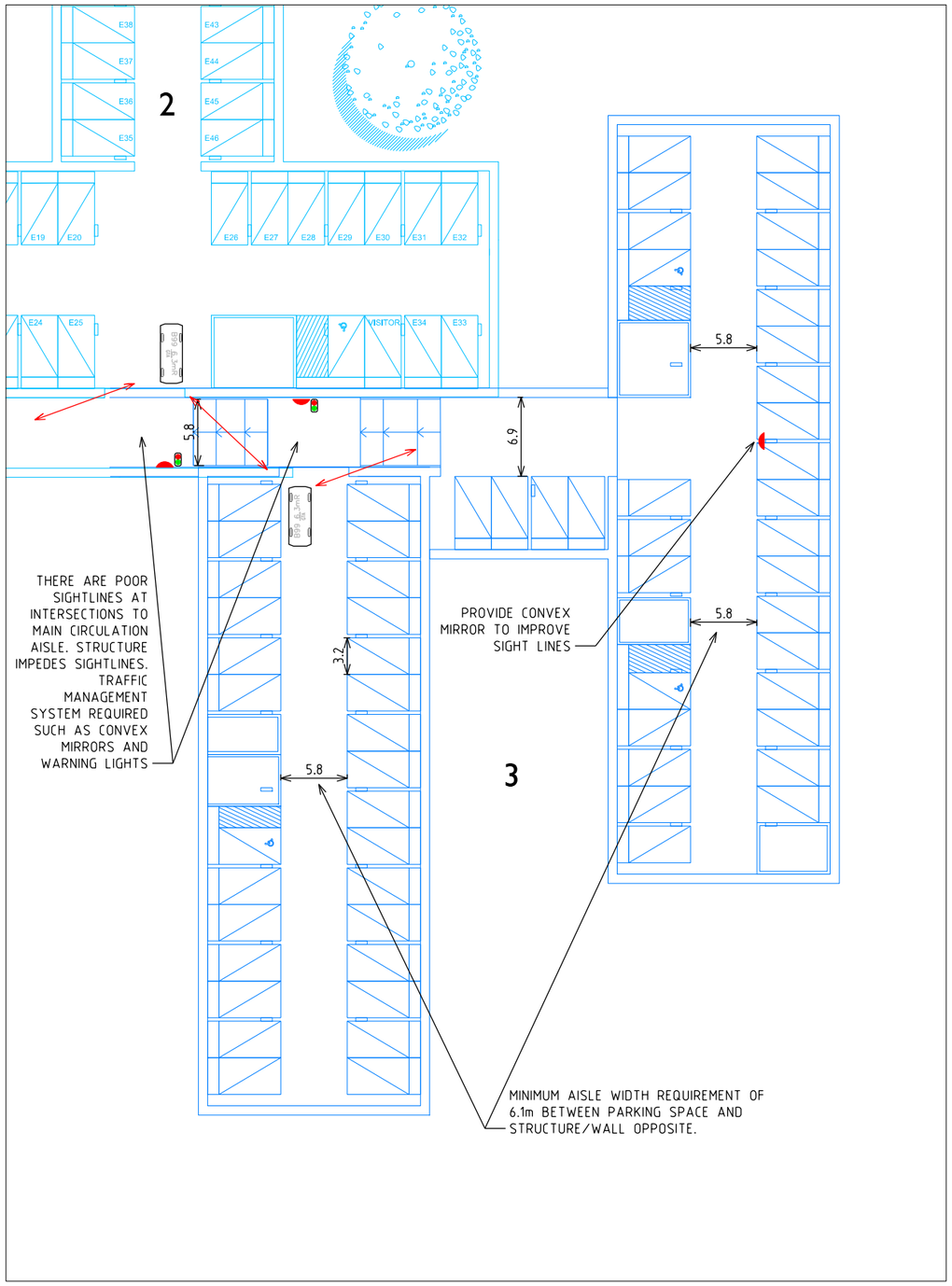

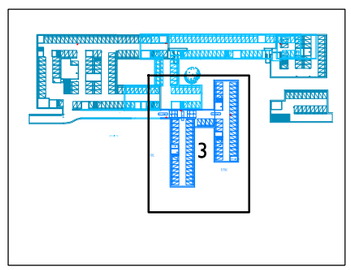

BASEMENT 3 LOCATION KEY

PLOTTED BY : CliffordAguirre ON 22/03/2018 AT 11:48:00 AM

GTAconsultants
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Sydney	02 8448 1800
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Gold Coast	07 5510 4814
Townsville	07 4722 2765
Perth	08 6169 1000

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

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DESIGN CHECK H.OBERMAIER
APPROVED BY -
DATE ISSUED 22 MARCH 2018

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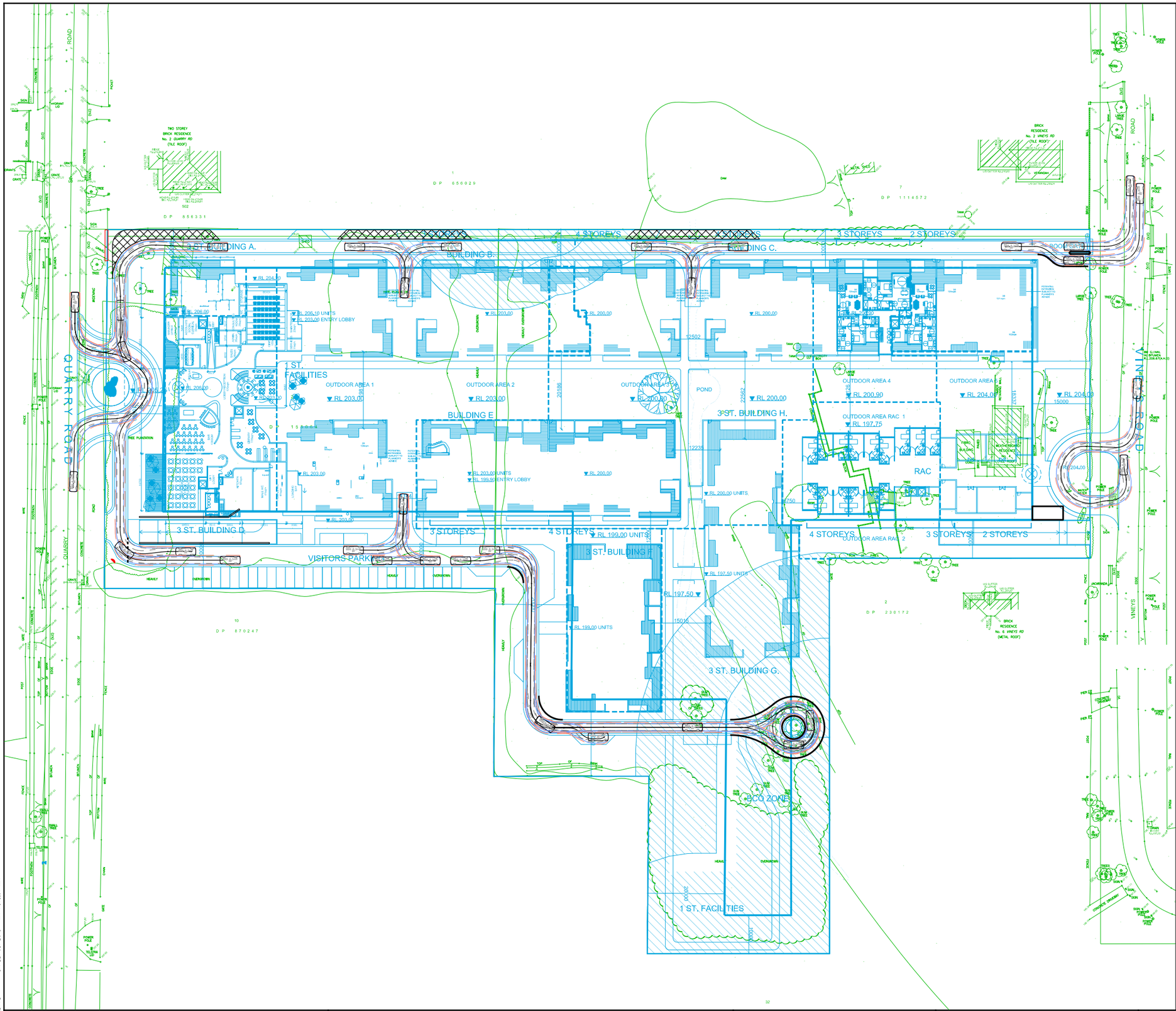
CAD FILE NO. N142020-01-P2.dgn

3 QUARRY ROAD, DURAL

BASEMENT 3
CARPARK COMPLIANCE REVIEW

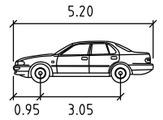
DRAWING NO. N142020-01-04 SHEET 04 OF 11 ISSUE P1



SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



B99 6.3mR

	metres
Width	: 1.94
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

PLOTTED BY : Clifford.Aguirre ON 22/03/2018 AT 11:48:01 AM

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Gold Coast	07 5510 4814
Townsville	07 4722 2765
Perth	08 6169 1000

PRELIMINARY PLAN

FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

DESIGNED C.AGUIRRE	DESIGN CHECK H.OBERMAIER
APPROVED BY -	DATE ISSUED 22 MARCH 2018

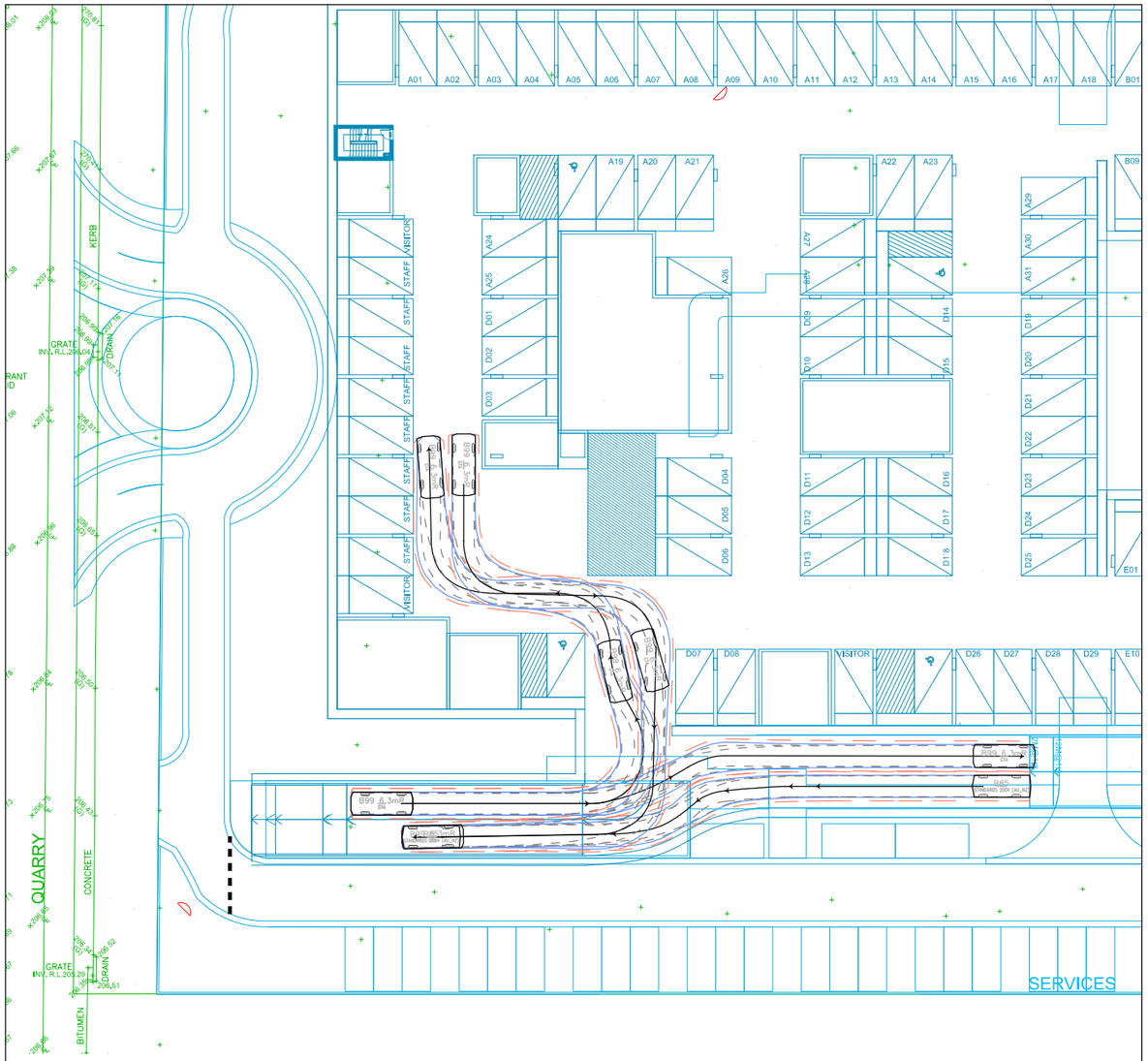
SCALE A3 — 0 5 10 — 1:500

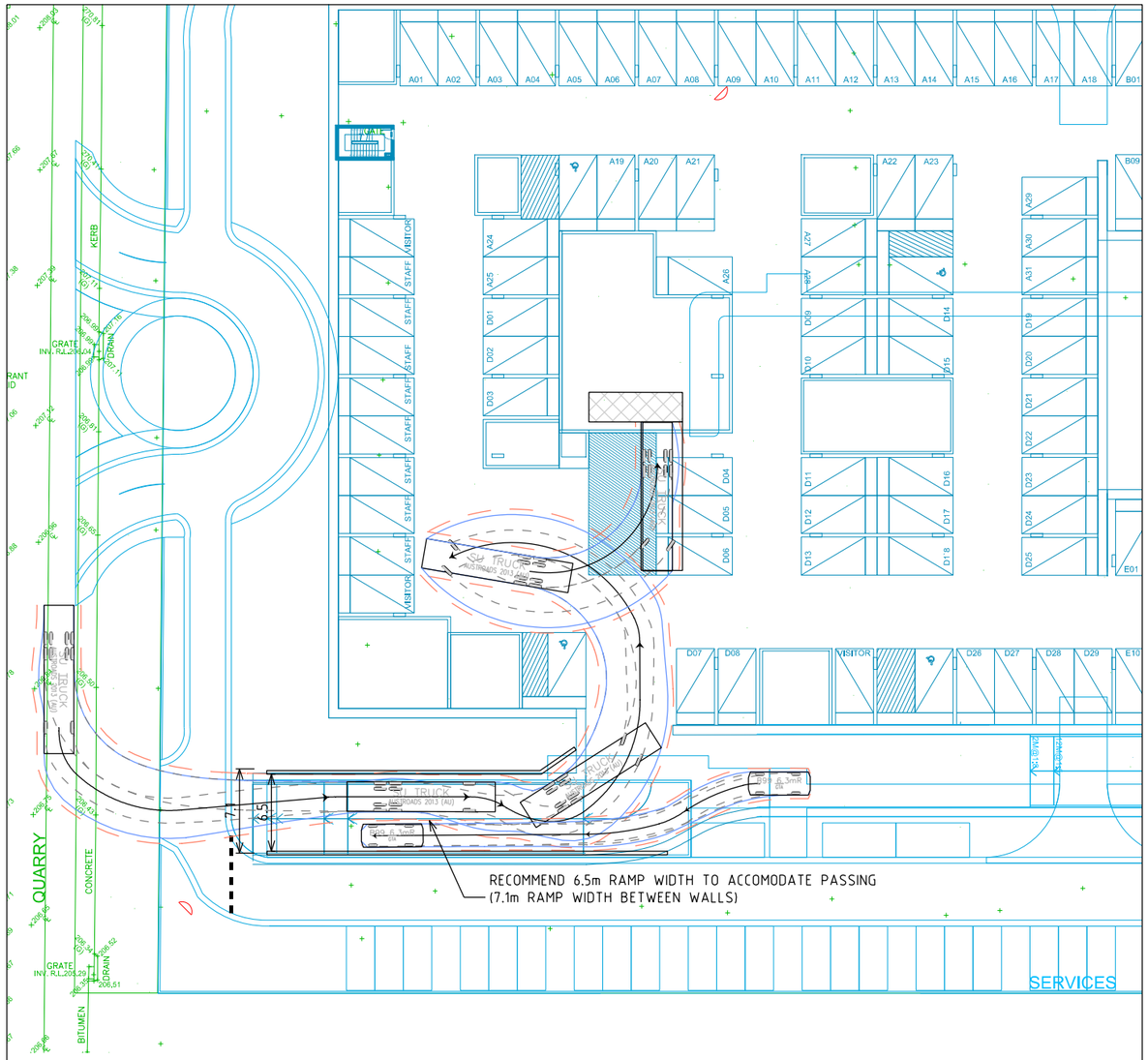
CAD FILE NO. N142020-01-P2.dgn

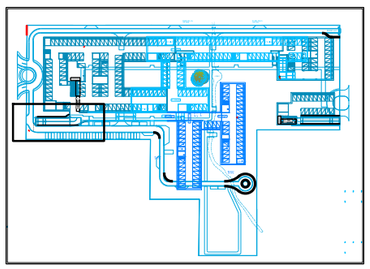
3 QUARRY ROAD, DURAL

GROUND LEVEL
SWEPT PATH ASSESSMENT

DRAWING NO. N142020-01-05 SHEET 05 OF 11 ISSUE P1



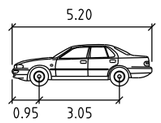




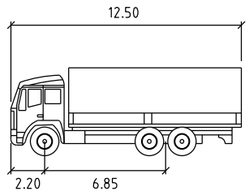
SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



B99 6.3mR	metres
Width	: 1.94
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.0



SU TRUCK	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

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Gold Coast	07 5510 4814
Townsville	07 4722 2765
Perth	08 6169 1000

PRELIMINARY PLAN

FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

DESIGNED C.AGUIRRE	DESIGN CHECK H.OBERMAIER
APPROVED BY -	DATE ISSUED 22 MARCH 2018

SCALE A3 — 0 5 10 — 1:500

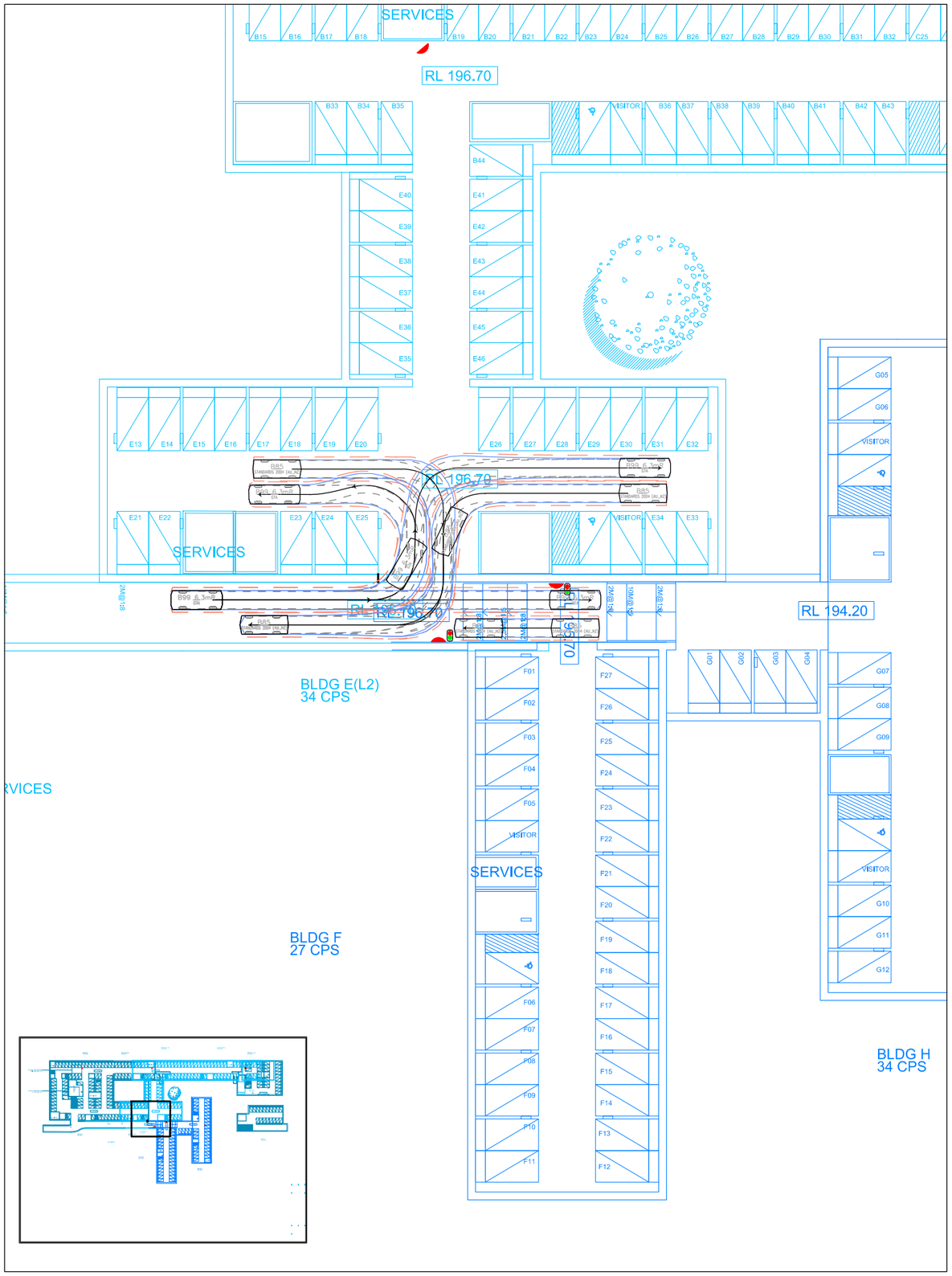
CAD FILE NO. N142020-01-P2.dgn

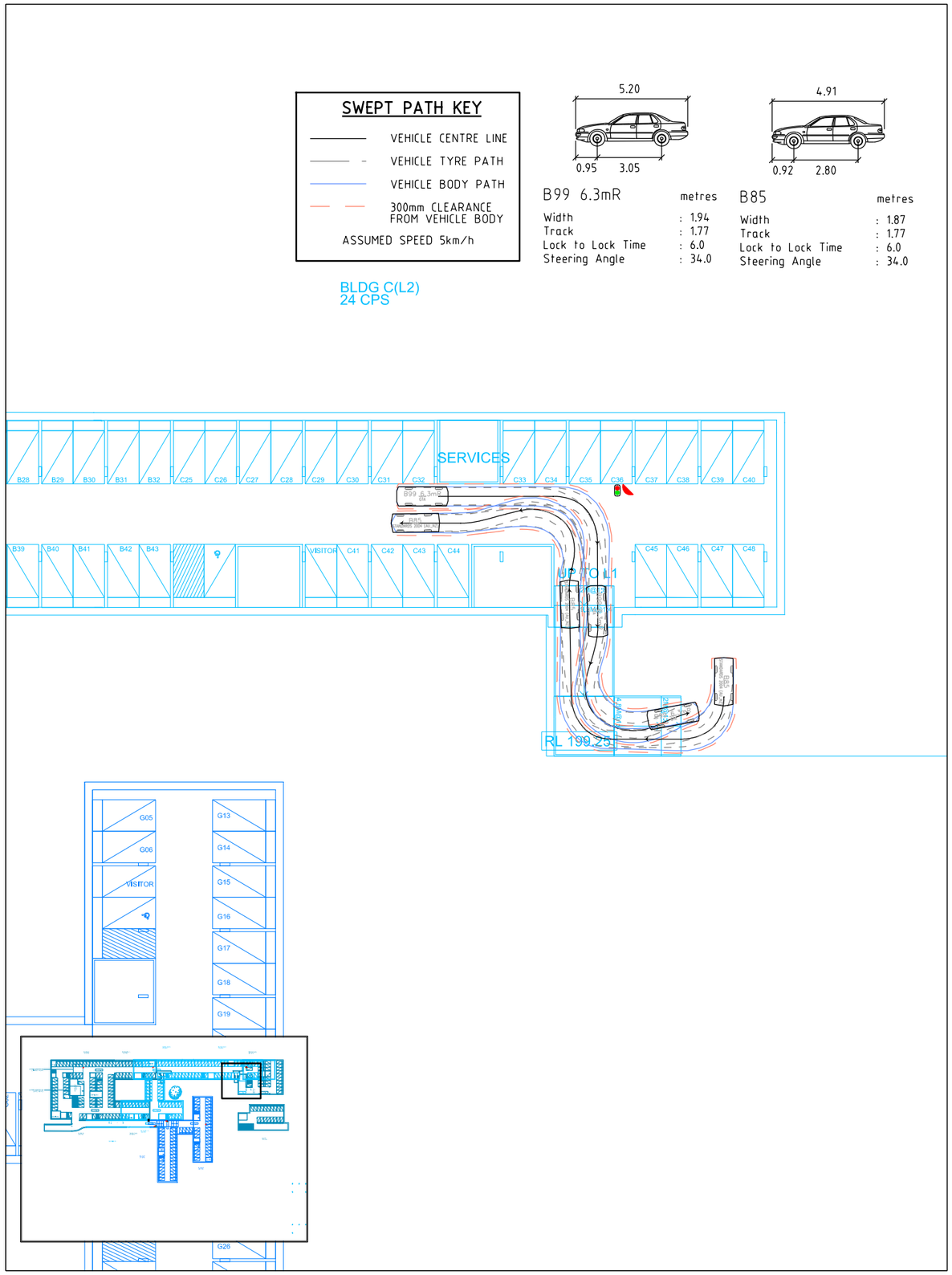
3 QUARRY ROAD, DURAL

BASEMENT 1
SWEPT PATH ASSESSMENT

DRAWING NO. N142020-01-06 SHEET 06 OF 11 ISSUE P1

PLOTTED BY : Clifford.Aguirre ON 22/03/2018 AT 11:48:06 AM





PLOTTED BY : Clifford.Aguirre ON 22/03/2018 AT 11:48:08 AM

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Brisbane	07 3113 5000
Canberra	02 6243 9400
Adelaide	08 8334 3600
Gold Coast	07 5510 4814
Townsville	07 4722 2765
Perth	08 6169 1000

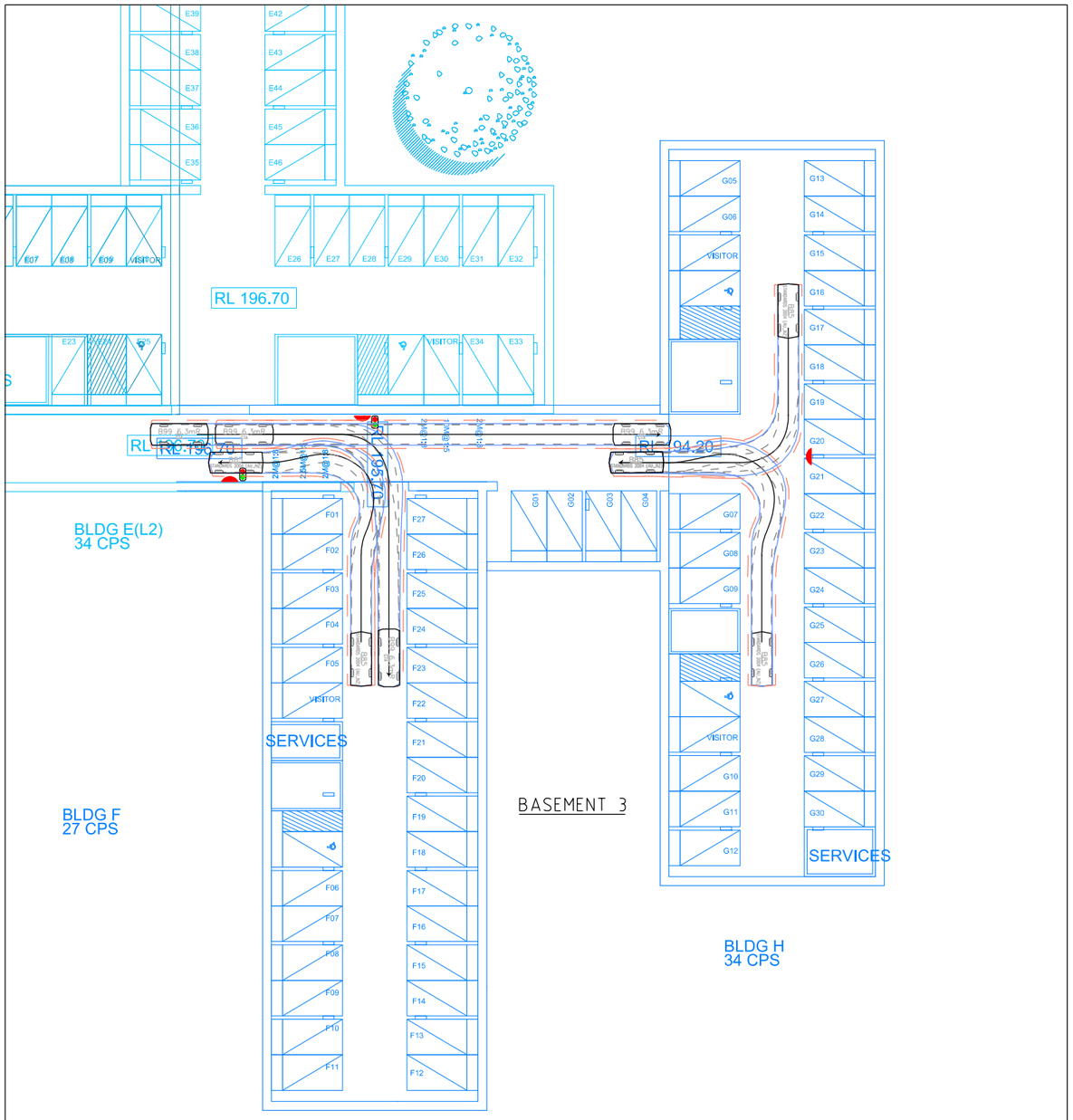
PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

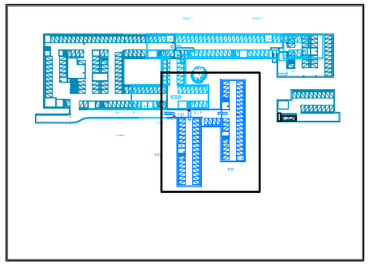
DESIGNED C.AGUIRRE
DESIGN CHECK H.OBERMAIER
APPROVED BY -
DATE ISSUED 22 MARCH 2018
SCALE A3 0 5 10 1:500
CAD FILE NO. N142020-01-P2.dgn

3 QUARRY ROAD, DURAL

BASEMENT 2
SWEPT PATH ASSESSMENT

DRAWING NO. N142020-01-07 SHEET 07 OF 11 ISSUE P1

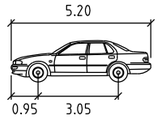


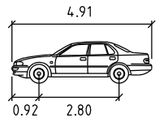


SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

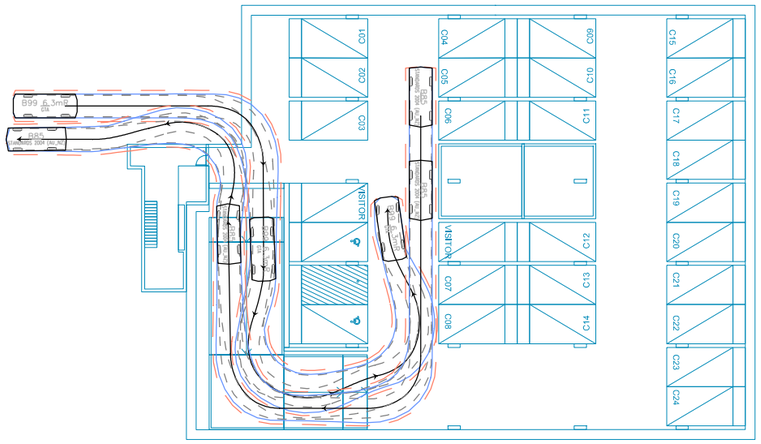
ASSUMED SPEED 5km/h



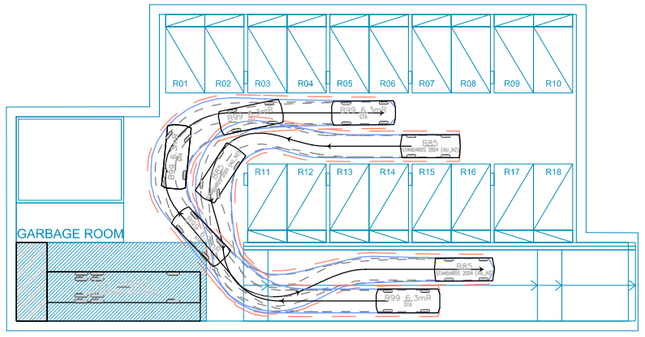


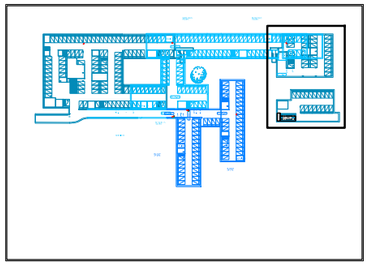
B99 6.3mR	metres
Width	: 1.94
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

B85	metres
Width	: 1.87
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.0



BASEMENT 1





PLOTTED BY : Clifford Aguirre ON 22/03/2018 AT 11:48:10 AM

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PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

DESIGNED C.AGUIRRE	DESIGN CHECK H.OBERMAIER
APPROVED BY -	DATE ISSUED 22 MARCH 2018

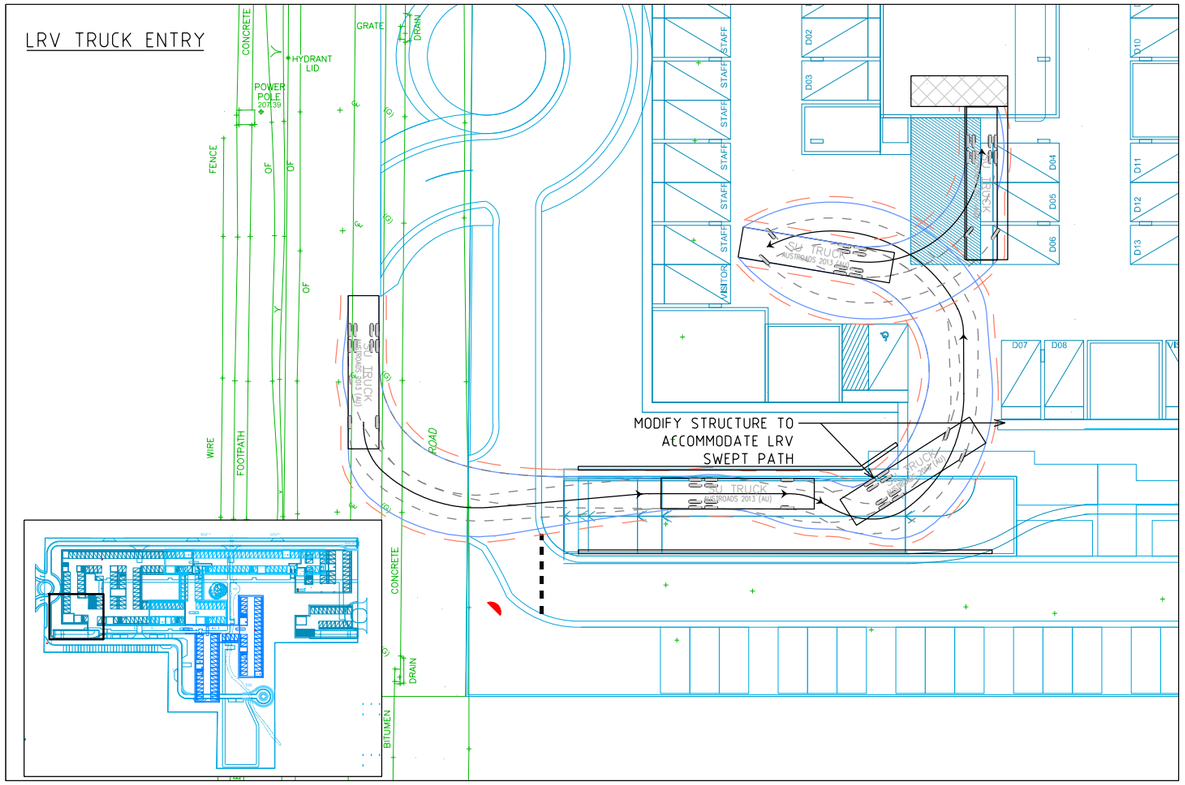
SCALE A3 — 0 5 10 — 1:500

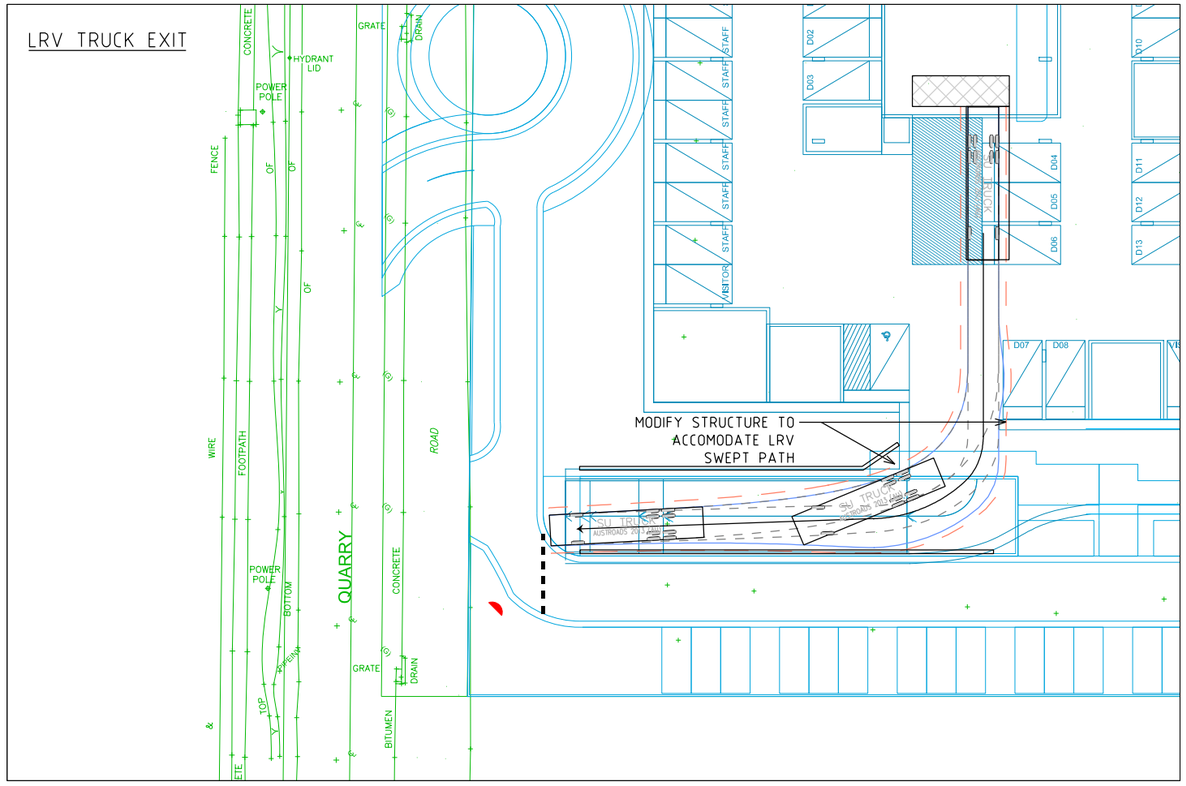
CAD FILE NO. N142020-01-P2.dgn

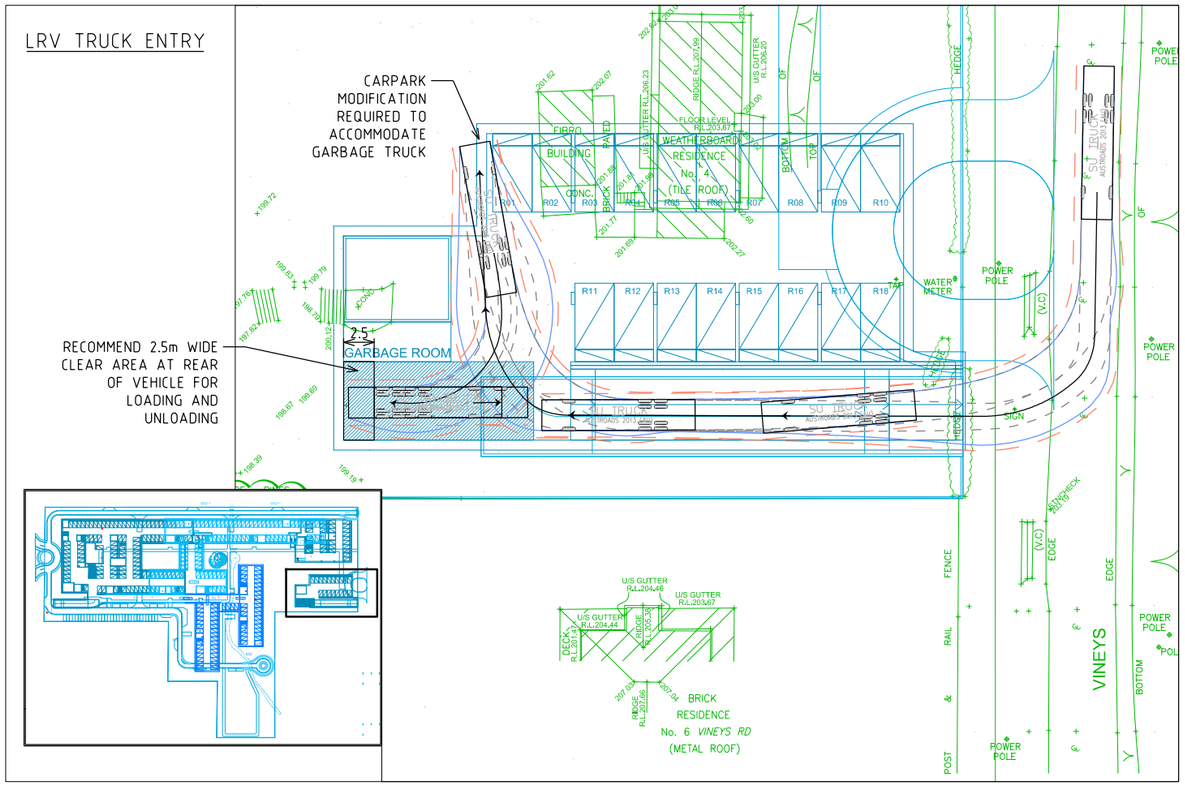
3 QUARRY ROAD, DURAL

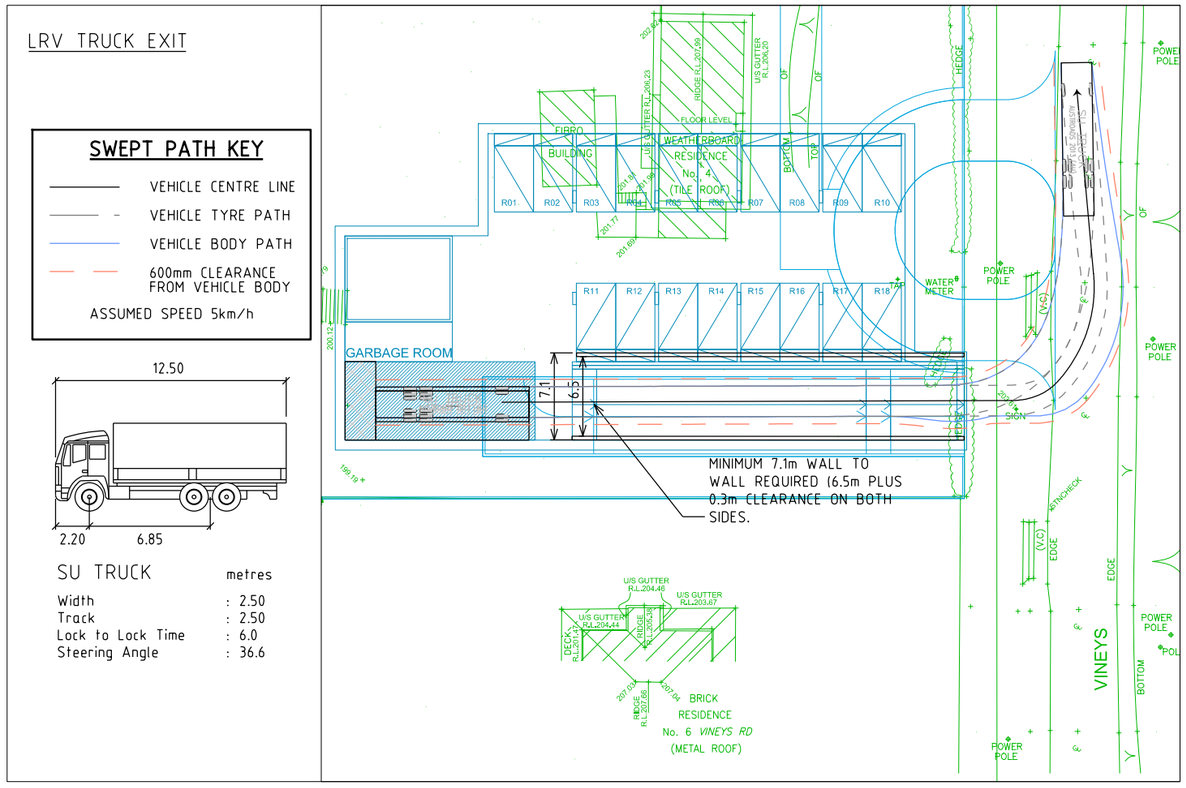
BASEMENT 3 AND BASEMENT 1
SWEPT PATH ASSESSMENT

DRAWING NO. N142020-01-08 SHEET 08 OF 11 ISSUE P1









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PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

DESIGNED C.AGUIRRE	DESIGN CHECK H.OBERMAIER
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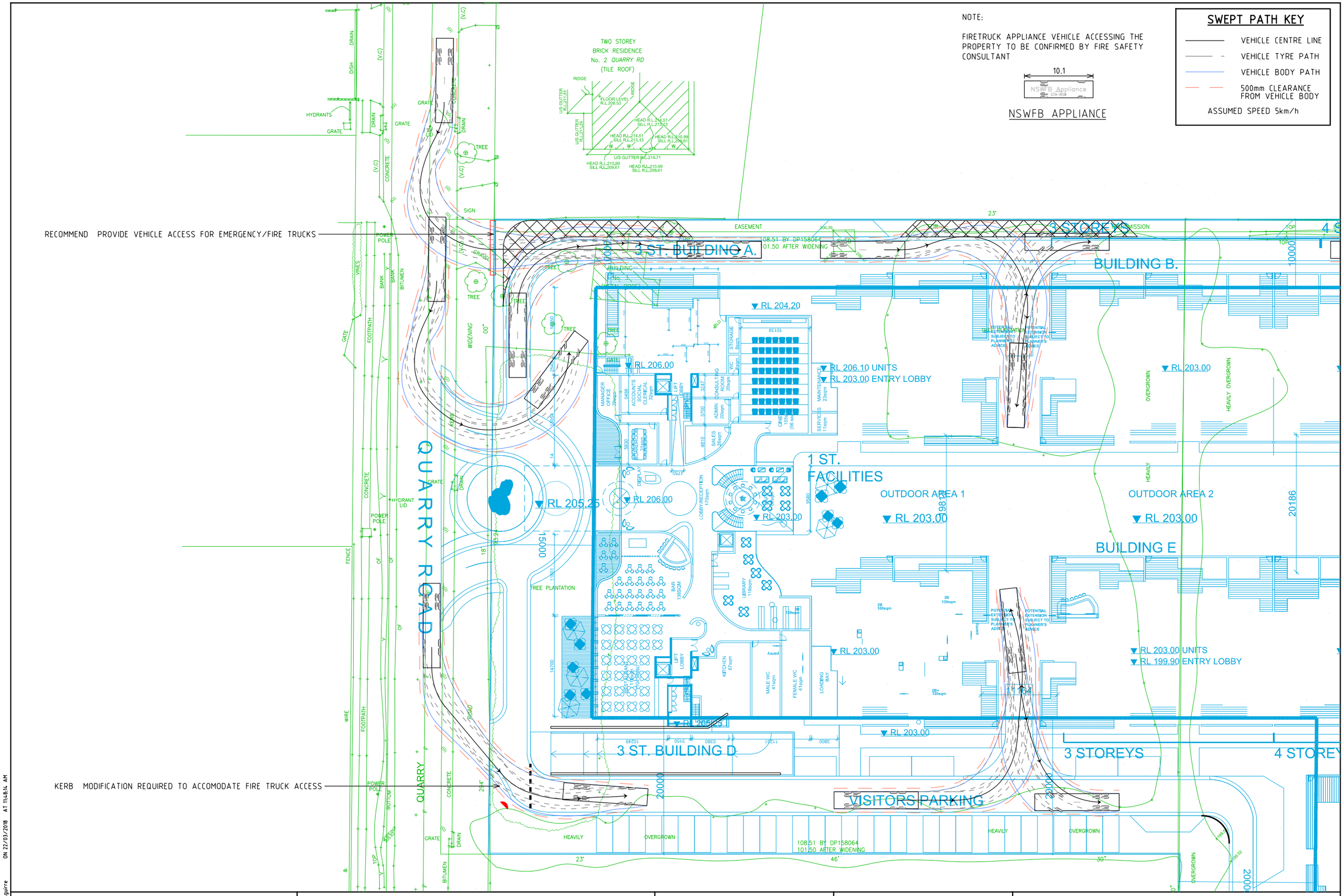
3 QUARRY ROAD, DURAL

GARBAGE TRUCK ACCESS SWEPT PATH ASSESSMENT

DRAWING NO. N142020-01-09 SHEET 09 OF 11 ISSUE P1



NOTE:

FIRETRUCK APPLIANCE VEHICLE ACCESSING THE PROPERTY TO BE CONFIRMED BY FIRE SAFETY CONSULTANT

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

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PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

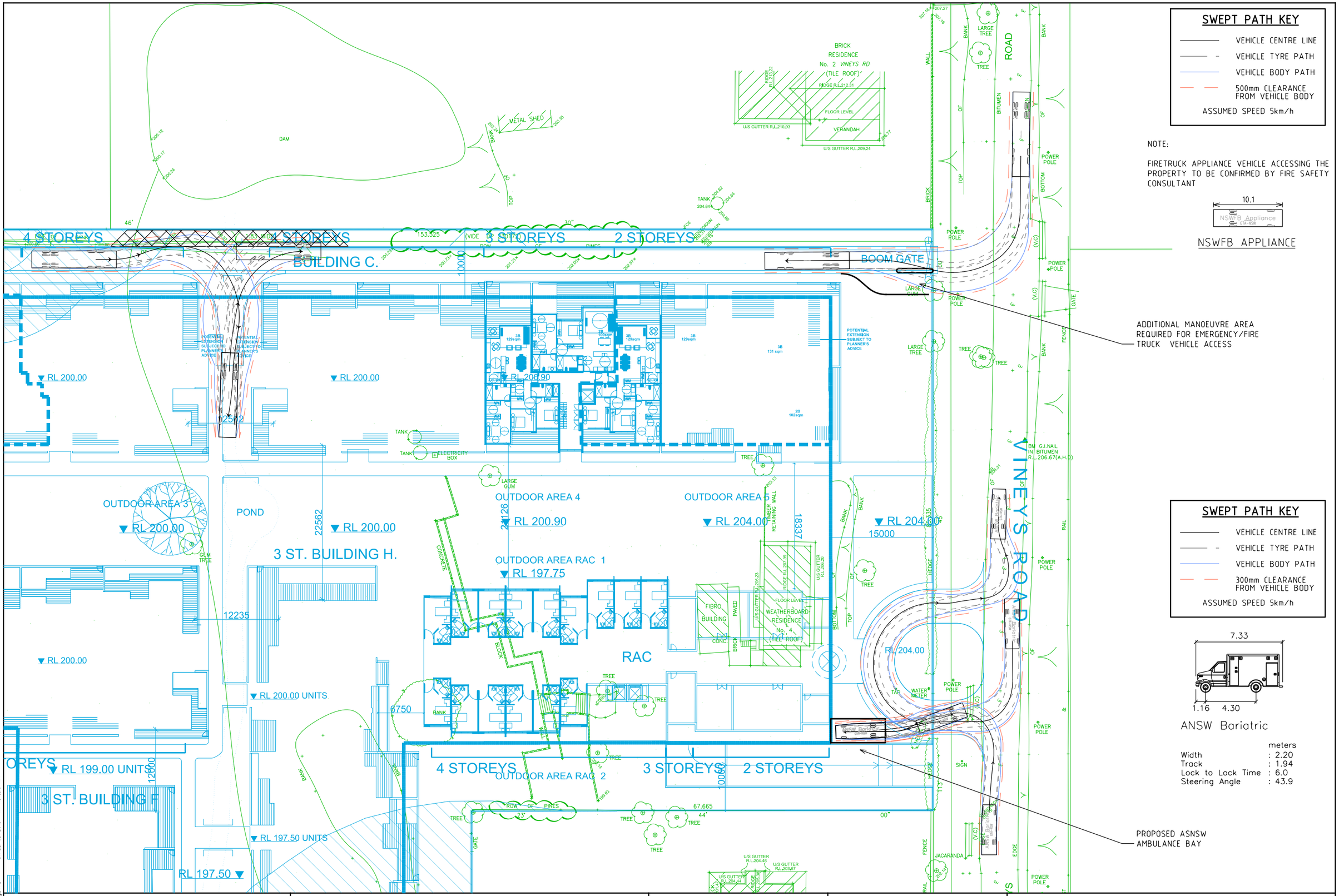
DESIGNED C.AGUIRRE
DESIGN CHECK H.OBERMAIER
APPROVED BY -
DATE ISSUED 22 MARCH 2018

SCALE A3 — 0 5 10 — 1:500
CAD FILE NO. N142020-01-P2.dgn

3 QUARRY ROAD, DURAL

GROUND LEVEL - FIRE TRUCK ACCESS SWEPT PATH ASSESSMENT

DRAWING NO. N142020-01-10 SHEET 10 OF 11 ISSUE P1


SWEPT PATH KEY
VEHICLE CENTRE LINE
VEHICLE TYRE PATH
VEHICLE BODY PATH
500mm CLEARANCE FROM VEHICLE BODY
ASSUMED SPEED 5km/h
NOTE:
FIRETRUCK APPLIANCE VEHICLE ACCESSING THE PROPERTY TO BE CONFIRMED BY FIRE SAFETY CONSULTANT
10.1
NSWFB Appliance
NSWFB APPLIANCE
ADDITIONAL MANOEUVRE AREA REQUIRED FOR EMERGENCY/FIRE TRUCK VEHICLE ACCESS
SWEPT PATH KEY
VEHICLE CENTRE LINE
VEHICLE TYRE PATH
VEHICLE BODY PATH
300mm CLEARANCE FROM VEHICLE BODY
ASSUMED SPEED 5km/h
7.33
1.16
4.30
ANSW Bariatric
meters
Width : 2.20
Track : 1.94
Lock to Lock Time : 6.0
Steering Angle : 43.9
PROPOSED ASNSW AMBULANCE BAY
BOOM GATE
4 STOREYS
BUILDING C.
3 STOREYS
2 STOREYS
DAM
METAL SHED
BRICK RESIDENCE No. 2 VINEYS RD (TILE ROOF)
RIDGE R.L.212.31
FLOOR LEVEL
VERANDAH
U/S GUTTER R.L.210.93
U/S GUTTER R.L.209.24
ROAD
VINEYS ROAD
POWER POLE
LARGE TREE
TREE
BM G.I.NAIL IN BITUMEN R.L.206.67(A.H.D)
OUTDOOR AREA 3
RL 200.00
POND
3 ST. BUILDING H.
OUTDOOR AREA 4
RL 200.90
OUTDOOR AREA 5
RL 204.00
RL 204.35
OUTDOOR AREA RAC 1
RL 197.75
RAC
FIBRO BUILDING
WEATHERBOARD RESIDENCE No. 4 (TILE ROOF)
RL 204.00
RL 200.00 UNITS
RL 199.00 UNITS
3 ST. BUILDING F
RL 197.50 UNITS
RL 197.50
4 STOREYS
OUTDOOR AREA RAC 2
3 STOREYS
2 STOREYS
ROW OF PINES
TANK
ELECTRICITY BOX
LARGE GUM
GUM TREE
JACARANDA
SIGN
TAP
WATER METER
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DESIGNED C.AGUIRRE
DESIGN CHECK H.OBERMAIER
APPROVED BY -
DATE ISSUED 22 MARCH 2018
SCALE A3
0 5 10
1:500
CAD FILE NO. N142020-01-P2.dgn
3 QUARRY ROAD, DURAL
GROUND LEVEL - FIRE TRUCK AND AMBULANCE ACCESS SWEPT PATH ASSESSMENT
DRAWING NO. N142020-01-11
SHEET 11 OF 11
ISSUE P1
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